Vol. 13 No. 2 APRIL, 1959

BRITISH JOURNAL OF PREVENTIVE & SOCIAL MEDICINE

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CONTENTS

PAGE

Incidence of Disease and Disability in Elderly Men. F. Edwards, T. McKeown, and A. G. W. Whitfield 51

Contributions and Demands of Elderly Men. F. Edwards, T. McKeown, and A. G. W. Whitfield 59

Observations on the Growth and Maturation of Indian Boys in Durban, South Africa. J. Abramson 67

Incapacity for Work among the Insured Population of Great Britain. G. M. Jones .. 74

Sex Pattern of Admissions to Mental Hospitals in Relation to Social Circumstances. C. R. Lowe and F. N. Garratt 88

LONDON
BRITISH MEDICAL ASSOCIATION
TAVISTOCK SQUARE, W.C.1

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Brit. J. prev. soc. Med. (1959), **13**, 51–58

INCIDENCE OF DISEASE AND DISABILITY IN ELDERLY MEN

BY

FELICITY EDWARDS, THOMAS McKEOWN, AND A. G. W. WHITFIELD

From the Medical School, University of Birmingham

Our statistical knowledge of the implications of ageing may be summed up by the statement that it is possible to assess the chances of living to be old, but not whether it is worth doing so. National life tables show the average number of years which can be expected by an individual of any age, but there are few data giving the incidence of disabilities according to age, and none which enable us to construct a balance sheet of pleasures and pains in old age. Whether "chloroform at sixty", which Osler recommended on public grounds, would also be advisable for private reasons, is still, so far as statistics are concerned, an open question.

In a previous communication (Brown, McKeown, and Whitfield, 1958), the incidence of disease and disability and of fitness for employment was examined in a group of representative men aged 60-69. It was thought worthwhile to extend the inquiry to men over 70, but because the focus of interest is not the same at the later ages we have treated the material somewhat differently. This first report is concerned with the significance of ageing from the point of view of the individual, as reflected in the frequency of disease and disability, and in the relative importance attached to specific pleasures and complaints. A later report will consider the significance of ageing from the point of view of the community, as shown by the increasing demand for medical and social services, and by declining ability to contribute through gainful employment.

The discussion which follows is arranged in three parts. The first part gives the incidence of specific diseases according to age and social class. The second part examines the increase with age in the frequency of disability, and the extent to which class differences are attributable to specific diseases. In the last part an attempt is made to assess the relative importance of the various things which give pleasure or cause discomfort to old people. It is of course a subjective assessment, but it could scarcely be anything else.

METHODS

The method of obtaining the data was an extension of that used in the earlier inquiry. The eleven Birmingham general practitioners who had previously examined men on their lists aged 60-69 agreed to attempt to make a similar assessment for all men of 70 and over. In view of the change in emphasis in the later investigation, the form used was not identical with the earlier one, data recorded being as follows:

(*a*) *Medical Data.*—The examination was again of the "life insurance" type. Coronary disease was not, however, the subject of special inquiry (as it had been previously) and men with suggestive signs and symptoms were not referred for further investigation.

(*b*) *Care Required.*—The type and frequency of care required was noted in respect of medical care, technical nursing, basic nursing and domestic help.

(*c*) *Employment and Fitness for Employment.*—The last full-time employment before age 65 and the occupation (if any) at the time of the survey were recorded. In the light of the information obtained from the history and physical examination, the doctors tried to assess each individual's fitness for employment. Patients were asked to indicate the extent of the physical and mental demands of the job they had been doing at 65, or when they last worked if they had retired before 65.

(*d*) *Personal Data*—The personal data included observations on sleep, food, drink, and smoking habits. Men were also asked to state in order of importance their three chief sources of pleasure, and their three chief complaints. It was made clear that the latter were intended to include not only specific medical complaints, but such problems as inability to sleep, loneliness, etc.

Table I shows the number of men over 70 (838) on the lists of the eleven general practitioners, and the

TABLE I

NUMBER OF MEN AGED 70 AND OVER ON THE LISTS OF ELEVEN GENERAL PRACTITIONERS

Men aged 70 and Over		No.	Per cent.
Examined		691	82·5
Not Examined	Dead	59	7·0
	Untraced	44	5·3
	Other	44	5·3
Total		838	100

proportion (82·5 per cent.) examined. Of those not examined, 59 were dead when the investigation began and 44 were untraced and had presumably moved from the area; these anomalies arise because lists are never quite up to date. The remaining 44 men were not examined for other reasons, usually because they were not at home at the times of the doctors' visits. Since a serious attempt was made to see all men at home or at a surgery, we believe that no bias has been introduced by the exclusions, and this view is supported by an examination of the age and social class composition of the sample.

Table II shows that the age distribution is approximately the same as that of men over 70 in Birmingham and in England and Wales.

Table III gives the same data for social class; in the case of Birmingham the distribution is known (from the 1951 Census) only for men aged 15 and over. Except for a small excess of men in Class II, and a corresponding deficiency in Classes IV and V, understandable in view of the age difference, the distribution of the sample is approximately the same as that of Birmingham, and does not differ substantially from that of England and Wales. It seems justifiable, therefore, to regard the sample as being reasonably representative of all men of the same age in the city, and to a lesser extent, in the country as a whole.

(1) Disease Incidence

At the outset we are confronted with the difficulty of assessing the incidence and significance of disease in a group of individuals, in view of the fact that a list of all conditions diagnosed takes no account of their relative importance or of the occurrence of more than one abnormality in the same individual. In Table IV we give the proportions of men with each of the

TABLE II

AGE DISTRIBUTION

Age (yrs)		70–74	75–79	80–84	85–89	90–94	95 & over	Total
Birmingham Sample	No.	338	213	93	41	5	1	691
	Per cent.	48·9	30·8	13·5	5·9	0·7	0·2	100
Birmingham County Borough*	Per cent.	51·1	31·2	13·3	3·7	0·6	0·1	100
England and Wales*	Per cent.	49·6	31·4	13·8	4·2	0·8	0·1	100

* From 1951 Census

TABLE III

SOCIAL CLASS DISTRIBUTION

Social Class		I	II	III	IV	V	Total
Birmingham Sample	No.	24	112	394	82	79	691
	Per cent.	3·5	16·2	57·0	11·9	11·4	100
Birmingham County Borough* (Men aged 15 and Over)	Per cent.	2·2	11·5	59·0	14·3	13·0	100
England and Wales* (Men aged 70 and Over)	Per cent.	3·9	19·0	44·6	17·3	15·2	100

* From 1951 Census

TABLE IV

PERCENTAGE OF MEN WITH EACH OF THE SIX DISEASES MOST FREQUENTLY ENCOUNTERED IN THE SURVEY

Disease	Age (yrs)					No. of Men Affected	Percentage of Affected Men in whom the Disease caused Disability
	70–74	75–79	80–84	85 and Over	Total		
Bronchitis	22·8	22·5	24·7	17·0	22·6	156	50·6
Hypertension	22·8	23·0	14·0	19·1	21·4	148	10·8
Coronary Disease	14·8	19·2	15·1	19·1	16·5	114	48·2
Arthritis	11·5	19·2	15·1	21·3	15·1	104	38·5
Hernia	10·7	10·3	14·0	10·6	11·0	76	1·3
Peptic Ulcer	8·9	9·4	5·4	2·1	8·1	56	12·5
No. of Men	338	213	93	47	691		

six most common diseases. In this report, unlike the earlier one, we have tried to separate specific diseases (such as bronchitis and peptic ulcer) from disabilities of less specific origin (such as blindness and deafness). The diagnoses were based on the clinical judgement of the general practitioners, except in the case of hypertension, in which diastolic and systolic pressures above 100 and/or 200 mm. Hg respectively were regarded as abnormal. While an arbitrary classification of this kind is useless for many purposes (this subject is discussed more fully elsewhere: Edwards, McKeown, and Whitfield, 1959), it was considered sufficiently reliable to draw attention to gross changes in frequency of raised blood pressure according to age and social class.

As in men aged 60-69, chronic bronchitis was the commonest disease, approximately one quarter being affected, and of those affected about half were in some degree disabled by the condition. (For this purpose we have considered a disease to be disabling if it interfered in any appreciable degree with an individual's life.) For coronary disease and arthritis the proportions of men disabled (48·2 and 38·5 per cent. respectively) were also high, but they were low for hypertension, hernia, and peptic ulcer. The other point in Table IV worth comment is the absence of a consistent age trend in the incidence of any of the common diseases, except arthritis which increased in frequency, and possibly peptic ulcer which decreased. This result is of course attributable to selective mortality from diseases such as bronchitis, hypertension, and coronary disease.

Table V shows the percentage of men with each of the six commonest diseases according to social class. Only in bronchitis is the relationship regular and pronounced, the proportions affected being 15·4 per cent. in Classes I and II (professional and intermediate occupations) and 31·1 per cent. in Classes IV and V (partly skilled and unskilled occupations) respectively.

It is conceivable that the relationship (or absence of relationship) between the incidence of these diseases and social class might be affected by class differences in age distribution. This possibility is perhaps somewhat unlikely, in view of the absence of consistent age trends (Table IV); nevertheless we have examined the effect of age-standardization on the incidence of bronchitis according to social class. The effect on the percentages given in Table V is negligible. Standardization for social class also had no appreciable effect on the results in Table IV.

TABLE V

PERCENTAGE OF MEN WITH EACH OF SIX DISEASES MOST FREQUENTLY ENCOUNTERED IN THE SURVEY, BY SOCIAL CLASS

Disease	Social Class			No. of Men Affected
	I and II	III	IV and V	
Bronchitis ..	15·4	21·6	31·1	156
Hypertension ..	22·8	22·3	18·0	148
Coronary Disease	25·0	14·5	14·3	114
Arthritis	8·8	17·5	14·3	104
Hernia	11·0	11·4	9·9	76
Peptic Ulcer ..	8·8	6·6	11·2	56
No. of Men ..	136	394	161	

(2) Extent of Disability

It is of course extremely difficult to find a satisfactory basis for assessment of the presence of disability, or of degree of disability. All that we have attempted is (*a*) to decide whether an individual was in some appreciable degree inconvenienced (either by specific disease such as bronchitis, or by some less specific condition such as deafness, weakness, etc.), and (*b*) to inquire whether, if present, a disability would restrict an individual's full-time employment. It is obvious that the first of these criteria takes no account of educational or other differences, and was thus applied consistently to all social classes. The second index was graded according to the kind of work a man could be expected to do, and hence was a less severe test in Social Class I, in which there are many sedentary occupations, than in Class V, in which most occupations make heavy physical demands. The decision as to whether a man was to be regarded as disabled was made by the general practitioners after recording the history and completing the physical examination.

Table VI gives the proportion of men disabled according to age. The percentage without any disability decreases from 29·3 at ages 70-74, to 6·4 at 85 and over; the percentage restricted in respect of

TABLE VI

PERCENTAGE OF MEN WITH DISABILITY, BY AGE

Age (yrs)	70–74	75–79	80–84	85 and Over	Total
Percentage with Disability which would restrict Full-time Employment	51·8	73·2	77·4	93·6	64·7
Percentage with Disability which would not restrict Full-time Employment ..	18·9	8·5	9·7	0·0	13·2
Percentage not Disabled ..	29·3	18·3	12·9	6·4	22·1
No. of Men	338	213	93	47	691

full-time employment increases from 51·8 to 93·6. (As mentioned above, the question of fitness for employment will be treated more fully in the later communication. Here we are concerned with it only as a broad index of disability.)

Table VII shows the proportion of men disabled according to social class. Perhaps the most interesting figure is again the percentage not disabled, which falls regularly from 37·5 per cent. in Class I to 11·4 per cent. in Class V. It seemed possible that this result was affected by age differences in class distribution, for if men in Class V were somewhat younger than those in Class I—not an unlikely possibility—the trend shown in Table VII might understate the extent of the class difference. The effect of correction by standardization for age was very small, however, and scarcely affected the results exhibited in Table VII. (A similar standardization to correct the age trend in Table VI for social class differences also had a trivial effect.)

TABLE VII

PERCENTAGE OF MEN WITH DISABILITY, BY SOCIAL CLASS

Social Class	I	II	III	IV	V
Percentage with Disability which would restrict Full-time Employment	41·7	46·4	67·2	70·7	78·5
Percentage with Disability which would not restrict Full-time Employment	20·8	17·9	12·2	12·2	10·1
Percentage not Disabled	37·5	35·7	20·6	17·1	11·4
No. of Men	24	112	394	82	79

We now inquire to what extent these class differences in the incidence of disability were attributable to specific diseases. The class differences were even more marked at ages 60-69, and we have therefore included data from the earlier inquiry in the examination. For this purpose it has been necessary to combine Classes I and II and Classes IV and V to obtain sufficiently large numbers. In Fig. 1 (opposite) it is shown that in both age groups a very large part of the class gradient was due to chronic bronchitis. This is not surprising, since bronchitis was the commonest disease, was the one associated with the highest incidence of disability, and showed a pronounced relationship to social class. No other single disease accounts for a substantial part of the gradient which remains after the effect of bronchitis is removed, the residual class differentiation being due to a large number of conditions each of which makes only a small contribution to the total.

So far we have been considering disabilities of all types. It was thought worthwhile to examine separately the incidence of the common specific disabilities, and it would probably be agreed that those listed in Table VIII are the most important. In this case, however, attention is confined to levels of disability which would represent severe handicaps. To be included mental disturbance had to be of a degree which would require some supervision, and hence excludes minor manifestations of disturbed behaviour some of which could certainly be regarded as disabling. Blindness includes only total or partial blindness. Deafness is based on the "very deaf" in a threefold classification of hearing: good, dull, very deaf. Data on mobility are given separately for the proportions (*a*) restricted out of doors and (*b*) restricted to indoors. The percentages in this case are obviously additive; that is to say that numbers restricted indoors do not of course include men with the less severe handicap of limitation in some degree out of doors. Criteria of incontinence need no comment.

What emerges from the application of these somewhat severe criteria is that, of the five disabilities, only

TABLE VIII

PERCENTAGE OF MEN WITH VARIOUS DISABILITIES, BY AGE

Disability		Age (yrs)					No. of Men Affected
		70–74	75–79	80–84	85 and Over	Total	
Mobility	Restricted out of doors	36·1	49·3	52·7	48·9	43·3	299
	Restricted to indoors	5·3	6·6	20·4	27·7	9·3	64
Incontinence		2·1	3·8	8·6	2·1	3·5	24
Blindness (total or partial)		3·3	3·3	3·2	6·4	3·5	24
Mental Disturbance requiring Supervision		2·1	1·9	6·5	2·1	2·6	18
Deafness		1·8	1·9	2·2	2·1	1·9	13

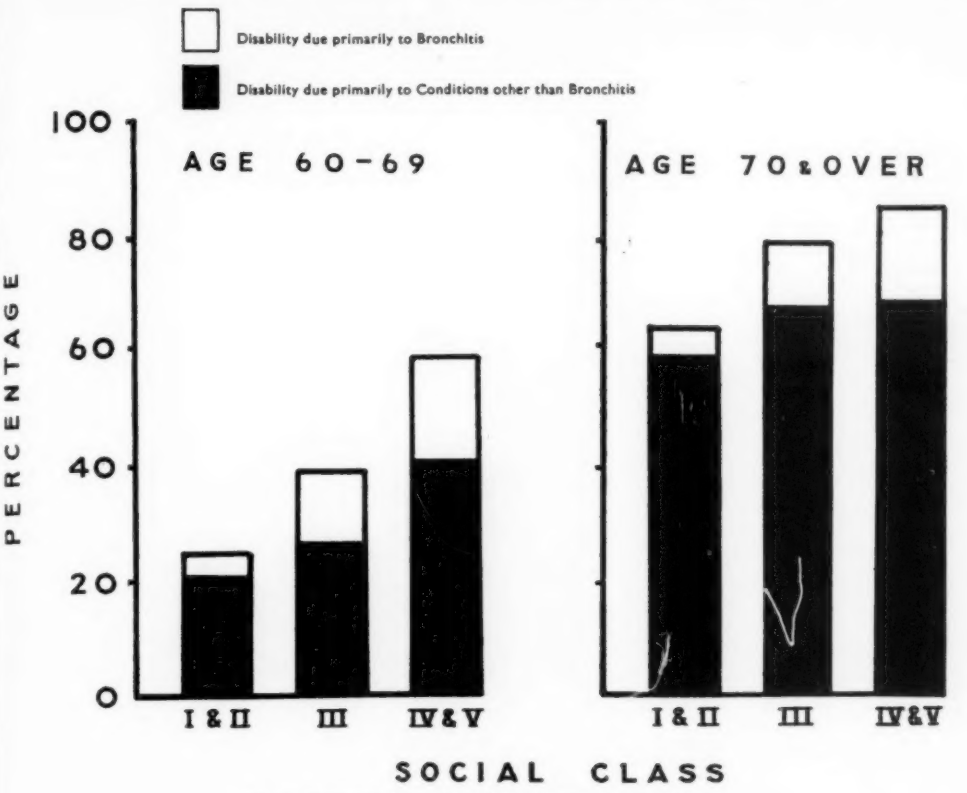

FIG. 1.—Percentage of men with disability (all grades), by social class.

restricted mobility is very common in any age group and increases consistently in frequency with age. The numbers of men aged 85 and over are rather small; when they are grouped with those aged 80-84, the only other consistent age trend is in respect of incontinence, which increases from 2·1 per cent. at 70-74 to 6·4 per cent. at 80 and over.

We have also examined the percentage of men with these various disabilities according to social class. The only consistent trend is an increase in the frequency of the less severe restriction of mobility (outdoors) from Classes I and II to Classes IV and V.

(3) Pleasures and Complaints

As stated in the discussion of method, men were asked to give their three main sources of pleasure and complaints in order of significance. These are not the kind of data which lend themselves to precise treatment, but Table IX is based on the chief pleasure and complaint. The only pleasure which can be said to be of outstanding importance is gardening, which between one-fifth and one-quarter gave as their main interest. And the most common complaint, if it can be referred to meaningfully as a single complaint, was "poor health", rather than any of those listed in Table VIII.

Additional information was collected about eating, smoking, drinking, reading, and the use of wireless and television, but the only data which seem of sufficient interest to be referred to here are related to sleeping habits and appetite. Although it appears in Table IX (overleaf), insomnia was not common (only 3·2 per cent. of men regarded it as their chief complaint, and 6·5 per cent included it in the first three). The mean number of hours slept (by day and night) increased slightly with age, from 7·4 (at 70-74) to 8·3

TABLE IX

PERCENTAGES OF MEN AGED 70 AND OVER GROUPED ACCORDING TO (*a*) CHIEF PLEASURE, AND (*b*) CHIEF COMPLAINT

(*a*) Chief Pleasure	Per cent.	(*b*) Chief Complaint	Per cent.
Gardening	22·6	Poor Health	35·7
Reading	8·4	Deafness	5·1
Radio or Television	8·0	Loss of Mobility	4·9
Company of Friends	6·4	Poor Sight	3·6
Walking	5·6	Insomnia	3·2
Watching Sporting Events	5·1	Loneliness	3·2
Smoking	4·6	Financial Worries	1·2
Work	4·5	Inability to Work	1·2
Other	28·9	Other	3·8
None	5·9	None	38·1

(at 85 and over). Table X gives the distribution of men according to the number of hours slept at night, and shows that the relationship between day and night sleep is U-shaped. Expressed differently, the duration of day sleep was greater among men who at night slept a little (whose day sleep probably interfered with night sleep) or slept a lot (whose sleep requirements were high) than among men who slept for a moderate period at night. There is perhaps nothing unexpected in this result. Duration of sleep (day and night) was unrelated to marital status or smoking habits.

TABLE X

DISTRIBUTION OF MEN, BY DURATION OF SLEEP

No. of Hours of Sleep per Night	No. of Men	Per cent.	Mean No. of Hours of Sleep per Day
Under 5	77	11·2	0·84
5	57	8·3	0·67
6	133	19·4	0·65
7	105	15·3	0·34
8	194	28·3	0·55
9 and Over	119	17·4	0·70
Total	685	99·9	0·61

About two-thirds of the men described their appetites as good, and less than one in ten said it was poor. There was little change in relation to age.

Table XI shows the relationship between appetite and smoking habits; the proportions with moderate and poor appetites were considerably higher in cigarette smokers than in men not smoking (for the first two rows of Table XI, $\chi^2 = 8{\cdot}13$; $0{\cdot}01 < P < 0{\cdot}02$); pipe smokers were intermediate between the two, and there were too few mixed smokers to justify a confident opinion. Appetite appeared to be unrelated to marital status and drinking habits.

TABLE XI

PERCENTAGE DISTRIBUTION OF MEN, BY APPETITE AND SMOKING HABITS

Appetite		Good	Moderate	Poor	Total
Men not Smoking (213)		71·8	23·5	4·7	100·0
Men Smoking	Cigarettes (237)	59·5	31·6	8·9	100·0
	Pipe (194)	68·0	23·2	8·8	100·0
	Mixed (39)	53·8	30·8	15·4	100·0

DISCUSSION

The observations recorded in this investigation were based on men living at home, and as a reflection of the change in frequency of disease and disability in the elderly they are deficient because they make no allowance for those in institutions. Men in municipal homes are probably at least as healthy as those at home, and no serious bias is introduced by their exclusion. Our main problem is to assess the effect of omission of men in hospitals.

The percentage of Birmingham men aged 60 and over who were in hospital at about the time of the survey is given in Table XII. (The numbers in each type of hospital were obtained in another enquiry and the total numbers in each age group were provided by the 1951 Census.) The proportion in hospital increased regularly from 1·1 per cent at ages 60-64 to 8·6 per cent at ages 85 and over.

TABLE XII

PERCENTAGE OF BIRMINGHAM MALES IN HOSPITALS

Age (yrs)		60–	65–	70–	75–	80–	85 and Over	No. of Men
Type of Hospital	Chronic Sick Hospitals	0·13	0·27	0·66	1·24	2·76	6·60	405
	Mental Hospitals	0·58	0·62	0·87	1·03	1·12	1·34	462
	Other Types of Hospitals	0·42	0·51	0·44	0·69	0·50	0·67	304
	All Hospitals	1·14	1·40	1·97	2·96	4·38	8·61	1,171
Birmingham Male Population*		21,090	16,597	12,365	7,560	3,219	1,045	

* From the 1951 Census.

It seems permissible to assume that all men in hospital had a disability which would restrict full-time employment. On this assumption they are included in Fig. 2, which gives the percentage of men with disability according to age from age 60. Data for the seventh decade were available from the previous inquiry (Brown, McKeown, and Whitfield, 1958). The figure shows separately the proportions (*a*) restricted in respect of full-time employment, and (*b*) restricted in some lesser degree. The inclusion of men in hospital had little effect on the original percentages of men disabled which were based on men living at home.

It is not possible to estimate with a reasonable degree of accuracy the effect of exclusion of hospital patients on the incidence of disease and specific disability. It is probable that it would be larger than in the case of the correction in Fig. 2. For example, if we assume that all patients in mental hospitals needed supervision because of their mental state (the standard used in Table VIII), for the four age periods 70-74, 75-79, 80-84, and 85 and over, the percentages of men with mental disturbance of this order are changed from 2·1, 1·9, 6·5, and 2·1 to 3·0, 2·9, 7·5, and 3·4 respectively. That these estimates are no more than a rough approximation is evident from the fact that we have assumed that men in chronic sick and other hospitals did not need supervision. Nevertheless they underline the obvious point that, although an assessment based on men living at home is acceptable in respect of the levels of disability shown in Fig. 2, it understates the frequency of the disabilities referred to in Table VIII. The reason is of course that the effect of omission of the hospital population is trivial in the case of disabilities which are common and considerable in the case of disabilities which are uncommon.

Our examination of the chief pleasures and complaints of elderly men shows that "gardening" was their only common pleasure, and "poor health" (as

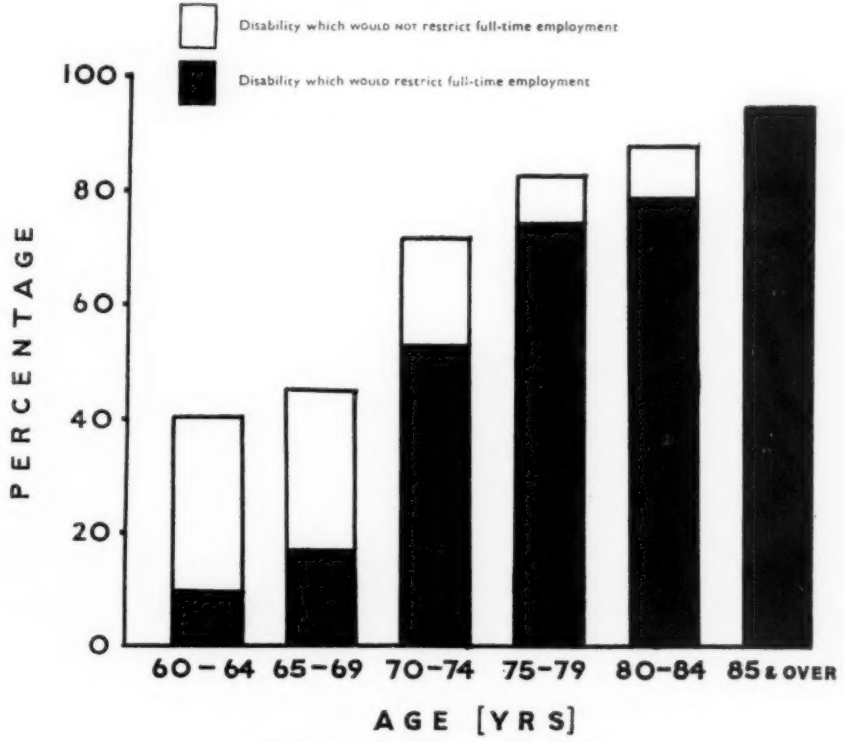

FIG. 2.—Percentage of men with disability, by age.

distinguished from specific disabilities such as deafness or loss of mobility) their only common complaint. Broadly the data indicate, what many of us have long suspected, that what Browning described in his much quoted version of ageing, was not typical old age, but healthy middle age, that pleasant interval after the children and before the disabilities, when the demands are lessened but the powers still undiminished. But if the outlook is less rosy than Browning suggested, it is also not so grim as that anticipated by his contemporary Arnold (in "Growing Old"). And there are comparatively few people who now find themselves before death "sans teeth, sans eyes, sans taste, sans everything". Particularly not "sans taste", for the findings on appetite confirm an observation which can be made in the dining room of any hotel in Bath or Bournemouth, that most human beings leave the world as they enter it, with a strong taste for food.

SUMMARY

Eleven Birmingham general practitioners examined 82·5 per cent. (691) of all the men on their lists aged 70 and over. In its distribution by age and social class (based on occupation) this sample is reasonably representative of all men over 70 in Birmingham and in England and Wales.

Of the six commonest diseases—bronchitis, coronary disease, arthritis, hypertension, hernia, and peptic ulcer—the first three were associated with a high incidence of disability. Only arthritis and possibly peptic ulcer showed an increase in frequency with age (a result presumably attributable to selective mortality at earlier ages), and only bronchitis has a marked association with social class.

The data are pooled with observations from a previous survey of men in the seventh decade to show the increase after age 60 in the incidence of disability which would either (*a*) restrict or prohibit full-time employment, or (*b*) cause appreciable inconvenience but not restrict employment (see Fig. 1). The frequency of disability was consistently related to social class, the proportions not disabled among men over 70 being approximately one-third and one-tenth in Classes I and V respectively. A very large part of the class gradient was attributable to chronic bronchitis.

Of men over 70, about one-quarter gave "gardening" as their chief pleasure, and one-third gave "poor health"—as distinguished from specific disabilities such as deafness, poor sight, etc.—as their chief complaint.

The effect of the bias introduced in these results by exclusion of men living in hospitals or other institutions is examined.

We are very greatly indebted to Dr. F. G. Alexander, Dr. Robert Browne, Dr. S. G. Burnie, Dr. D. L. Crombie, Dr. G. Forrest-Hay, M.B.E., Dr. W. B. Gough, Dr. R. N. E. Hinckley, Dr. J. E. Kerton, Dr. R. J. F. H. Pinsent, Dr. G. A. Readett, and Dr. J. A. H. Wiseman, who did the field work of this investigation, and to the United Birmingham Hospitals for a grant to cover the expenses.

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Brit. J. prev. soc. Med. (1959), **13**, 59–66

CONTRIBUTIONS AND DEMANDS OF ELDERLY MEN

BY

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In a previous communication (Edwards, McKeown, and Whitfield, 1959) observations on a representative group of men aged 70 and over were used to assess the frequency of disease and disability according to age. Broadly it was concerned with the implications of ageing from the point of view of the individual, and the discussion included a brief account of the chief sources of pleasure and discomfort in old age. In the present report, data obtained in the same investigation are used to examine the significance of ageing from the point of view of the community. For this purpose we have considered two questions: To what age can men contribute to the community? And what are the services which they require from it?

As an index of the potential contribution of elderly men we have used the proportion fit for full-time work. This may be thought an exacting test, particularly in the highest age groups in which the question of gainful employment scarcely arises. But the proportion fully employed is by no means negligible—it will be shown that in Birmingham it was 1 in 5 for men aged 70 and over—and for the purpose of presenting a broad picture of the contribution and demands of the elderly, it seemed the most satisfactory index. Appraisal of fitness for part-time employment is incomparably more difficult, since it may include anything from trivial to substantial amounts of work. For the present purpose we are not, of course, influenced by the conventional age of retirement. In assessing the services required by elderly men, we have considered medical care, technical nursing, basic nursing, and domestic help.

METHODS

The methods of investigation were described fully in the previous report (Edwards, McKeown and Whitfield, 1959), in which it was shown that the sample, consisting of 691 men (85·2 per cent. of all those aged 70 and over on the lists of eleven general practitioners), could be regarded as reasonably representative of all men in this age period in Birmingham, and to a lesser extent in England and Wales. In addition to the results of a medical examination, the data included the following observations relevant to the present inquiry:

(*a*) *Evaluation of Care Required.*—An attempt was made to assess both the amount and type of care needed, in respect of medical care, technical nursing, basic nursing, and domestic help. Assessment of the amount of care presented certain difficulties. Medical care may vary from daily attention to infrequent visits, and it was necessary to choose arbitrarily an interval to be regarded as significant. We have used "fortnightly or more often", with no more justification than the fact that "monthly visits" (the next interval in our classification) were thought not to justify being regarded as regular medical attention. Technical nursing raised fewer problems, for if needed at all it is usually needed frequently, and all intervals were included. Basic nursing and domestic help are also needed daily, and in assessing the amounts of care we have used a simple classification: "great, moderate, or trivial". We have not made use of the observations on type of care, partly because it is less significant in the present context than the amount, and partly because the results are confused in some cases by the need for more than one item of service. (For example the same patient may require washing, feeding, care of incontinence, etc.) The type of domestic help needed by elderly men is particularly difficult to assess if they are living with a wife or housekeeper who normally provides most services for them, for we are of course concerned solely with services required because of physical or mental limitations and not because the individual

has not the experience or is unwilling to undertake them (*e.g.* cooking).

(*b*) *Details of Employment.*—These included the man's work at age 65, and at the time of the survey if he was still working. If men were not in full-time employment they were asked to give their chief reason for leaving it.

(*c*) *Assessment of Fitness for Full-time Employment.*—This is inevitably a more theoretical matter in the elderly than in younger men. Nevertheless the doctors tried to determine whether a man was: unfit for any occupation; fit for his original occupation (the work done at age 65); unfit for the original but fit for the present occupation if working; unfit for the original and present occupation but fit for some other occupation.

Fitness for Employment

Table I gives the percentage of men employed full-time or part-time either (*a*) in their original occupation (defined as the last employment before age 65), or (*b*) in a different occupation, according to age.

Of the whole sample of men over 70, 20·0 per cent. were in full-time employment and 8·7 per cent. in part-time employment. In the previous enquiry it was shown that at age 69 approximately one out of every two men was doing full-time work; the corresponding figures for the five years 70–74 were one in three, and a few men over the age of 80 were still fully employed.

The proportions of elderly men working were substantially higher in Birmingham than in the country as a whole. In Birmingham the percentages employed (full-time and part-time) were 43 per cent. at ages 70–74 and 15 per cent. at 75 and over. The corresponding figures in England and Wales were 27 per cent. and 13 per cent. respectively (Census, 1951: Occupation Tables).

Reasons for remaining at work were somewhat different from those elicited from men in the seventh decade, of whom about four in five gave financial need as their main reason for continuing to do full-time work. Of the men over 70 approximately equal proportions (56 per cent. and 44 per cent. respectively) gave "financial need" and "personal preference" as their reason.

Among the men in full-time employment there were eight who were over 80 years of age, and it was thought of interest to give more detailed information about them (Table II, opposite). They were distributed fairly evenly by occupation and social class; two of them were doing work which made heavy physical demands; and equal numbers gave financial need and personal preference as their reason for remaining at work. With one exception they were all suffering from some form of disease or disability. One of those doing heavy work had inguinal hernia and varicose ulcers, and was quite deaf; the other had chronic bronchitis and inguinal hernia.

Table III (opposite) shows the variation in frequency of employment according to social class. Among all men over 70 there is a regular decline in the proportion in full-time work, from 29·2 per cent. in Social Class I (professional occupations) to 16·5 per cent. in Class V (unskilled occupations). This trend is much more marked than it was among men under the age of 70. There was no obvious relationship between social class and the reasons for remaining at work.

We turn now to the result of assessment of fitness for full-time employment. (For reasons given above, part-time work was not considered.) The assessment was made by the general practitioners immediately after the physical examination and the history, which included a description of the man's work (*a*) just before retirement (the "original" occupation) and (*b*) at the time of the survey if he was working. If a

TABLE I

PERCENTAGE OF MEN EMPLOYED, BY AGE

Age (yrs)			70–74	75–79	80–84	85 and Over	Total
Employment	Full-time	In original occupation	23·4	7·5	6·5	2·1	14·8
		In different occupation	7·7	4·2	1·1	0·0	5·2
		Total	31·1	11·7	7·5	2·1	20·0
	Part-time	In original occupation	6·2	2·4	4·3	2·1	4·5
		In different occupation	5·9	3·3	2·2	0·0	4·2
		Total	12·1	5·6	6·5	2·1	8·7
No. of Men			338	213	93	47	691

TABLE II

DETAILS OF EIGHT MEN AGED 80 AND OVER IN FULL-TIME EMPLOYMENT

Age (yrs)	Original Occupation			Occupation when Examined	Reason for Continuing Work	Medical Condition when Examined
	Type	Social Class	Physical Demands			
80	Solicitor's Clerk	III	Sedentary	Same	Financial	
81	Managing Director (basket manufacturer)	I	Sedentary	Same	Financial	Chronic bronchitis (Effort dyspnoea and weakness of legs)
82	Tool-maker (press tools)	III	Medium	Same	Personal preference	Osteo-arthritis (moderate) Kyphosis (moderate)
82	Motor Body Maker and Repairer ..	III	Heavy	Same	Financial	Inguinal hernia Varicose ulcers and eczema Deafness
82	Bridge Erector	III	Heavy	Driller (steel)	Personal preference	Chronic bronchitis Inguinal hernia
82	Tool-maker (for manufacture of drawing instruments)	III	Medium	Same	Personal preference	Hypertension (260/120) Inguinal hernia Poor sight
84	Portrait Painter	II	Medium	Same	Personal preference	Facial palsy
89	Labourer (constructional engineering) ..	V	Medium	Same	Financial	Dull hearing

TABLE III

PERCENTAGE OF MEN EMPLOYED, BY SOCIAL CLASS

Social Class		I	II	III	IV	V	Total
Employment	Full-time	29·2	24·1	19·3	18·3	16·5	20·0
	Part-time	29·2	4·5	8·4	11·0	7·6	8·7
No. of Men		24	112	394	82	79	691

man was considered unfit for his original employment, the doctor tried to assess whether he was fit for any other full-time work for which his training and experience prepared him. It will be evident that the test of fitness was more severe for men in heavy than for men in light occupations, and that it was based mainly on physical fitness, and could take little account of changes in mental capacity which might considerably reduce a man's usefulness.

Table IV gives the proportion of men considered fit for full-time employment according to age. It was approximately two in three at ages 70–74 and one in two for the whole sample of men at all ages over 70. (The reader is reminded that the corresponding proportions actually working full-time were one in three and one in five respectively. That is to say about half of those considered fit for work were at work.) But perhaps the most surprising conclusion suggested by the data in Table IV is that 28 of 93 men aged 80–84, and four of 47 over 85 were thought to be capable of full-time employment.

Table V (overleaf) gives details of the four men over 85, of whom three were considered fit for their

TABLE IV

PERCENTAGE OF MEN CONSIDERED TO BE FIT FOR FULL-TIME EMPLOYMENT, BY AGE

Age (yrs)		70–74	75–79	80–84	85 and Over	Total
Fitness	Fit for original work	49·1	27·2	22·6	6·4	35·9
	Unfit for original work, but fit for other employment	19·8	20·2	7·5	2·1	17·1
	Unfit for full-time employment ..	31·1	52·6	69·9	91·5	47·0
No. of Men		338	213	93	47	691

original work, and one unfit for his original work but fit for other work.

These data illustrate several aspects of the problem of assessment of fitness for employment. In the first place the mere presence of abnormalities such as hypertension, inguinal hernia, and defective hearing and vision gives little information about physical capacity. Secondly, assessment of fitness for employment can be made with much more confidence if the demands of the work under consideration are chiefly of a physical nature. (Thus we can probably accept the judgement in respect of the last two men listed in Table V, one of whom was in fact fully employed at 85.) And if the appropriate work is not chiefly of a physical character, the reliability of assessment turns largely on the nature of the mental demands. In the case of a cashier it seems reasonable to believe that

TABLE V

DETAILS OF FOUR MEN AGED 85 AND OVER CONSIDERED TO BE FIT FOR FULL-TIME EMPLOYMENT

Fitness	Age (yrs)	Original Occupation				Occupation when Examined	Medical Condition when Examined
		Type	Social Class	Physical Demands	Mental Demands		
Fit for Original Work	85	Naval Architect	I	Sedentary	Severe	None	Hypertension (210/130) Varicose veins Dull hearing
	85	Cashier (electro-plating firm) ..	II	Sedentary	Trivial	None	Angina Hypertension (205/95) Inguinal hernia Dull hearing
	89	Labourer (constructional engineering)	V	Medium	Trivial	Same (full-time)	Dull hearing
Unfit for Original Work, but Fit for Other Work	85	Packer (export)	IV	Medium	Moderate	None	Unilateral blindness Dull hearing

a general practitioner could make an acceptable judgement after examining and talking to one of his own patients. It is less certain that he could evaluate the capacity of a naval architect, whose work makes more exacting demands.

We have discussed at some length these four examples at the upper end of the age range because they give some idea of the significance which can be attached in general to the appraisal of fitness for employment. We believe it can be accepted with fair confidence in respect of men whose occupations made chiefly physical demands, or mental demands of a relatively simple character. This includes the great majority of occupations. It must be regarded with some reservation in respect of men whose work made exacting mental demands, in which case an intimate knowledge of actual performance would be required.

Finally, in relation to this same theme, we consider the proportion of men fit for full-time employment according to social class (Table VI).

TABLE VI

PERCENTAGE OF MEN CONSIDERED TO BE FIT FOR FULL-TIME EMPLOYMENT, BY SOCIAL CLASS

Social Class		I	II	III	IV	V	Total
Fitness	Fit for original work ..	66·7	54·5	33·0	29·3	21·5	35·9
	Unfit for original work, but fit for other employment	12·5	10·7	18·8	17·0	19·0	17·1
	Unfit for full-time employment ..	20·8	34·8	48·2	53·7	59·5	47·0
No. of Men		24	112	394	82	79	691

It was very much higher in Class I than in Class V (the proportions fit for any occupation were four in five and two in five respectively). It must be remembered, of course, that the standard of physical fitness required is higher in Class V, in which the actual or possible occupations make more exacting physical demands, than in Class I. The assessment was not made as a test of physical fitness, however, but as an index of the contribution which elderly men could conceivable make to the community. This contribution is inevitably influenced by their education, training, and experience.

Before accepting the conclusion suggested by Table VI, we must consider the effect of age differences between the classes. Mean age is lower in Class V than in Class I (because mortality is higher) and it is conceivable that the relationship between fitness for employment and social class is even more pronounced than that shown in Table VI. The data were therefore standardized to remove the influence of age. This procedure had only a trivial effect on the differences.

NEED FOR SERVICES

Tables VII and VIII (opposite) summarize the observations on the services needed by men over 70. Approximately two-thirds required medical supervision, in most cases at infrequent intervals; only about one in seven had to be seen as often as once a fortnight. Technical nursing—injections, dressings, administration of dangerous drugs, etc.—was needed by 5 per cent. As mentioned in the description of methods, the practitioners assessed the amount of basic nursing (washing, dressing, feeding, etc.) and domestic help as great, moderate, or trivial. Few (7 per cent.)

TABLE VII

PERCENTAGE OF MEN WHO REQUIRED MEDICAL CARE OR TECHNICAL NURSING

Frequency		More than Weekly	Weekly	Fortnightly	Monthly or Less	None
Care Needed	Medical Care	2·6	4·6	6·8	50·9	35·0
	Technical Nursing	3·2	0·7	1·0		95·1

TABLE VIII

PERCENTAGE OF MEN WHO REQUIRED BASIC NURSING OR DOMESTIC HELP

Amount of Care Required		Great	Moderate	Trivial	None
Care	Basic Nursing	1·0	3·9	1·7	93·3
	Domestic Help	11·3	24·2	15·6	48·9

required basic nursing, and the only common service was domestic help, which was needed by about half the men. The reader is reminded that a man was considered to need domestic help only if his physical condition prohibited him from doing the work himself.

DISCUSSION

Most discussions of the decline in capacity for work with increasing age have been focused on various forms of creative activity, and so far as we are aware there are few data related to the general population of workers. In this inquiry we have assessed the proportion of men fit to undertake full-time work at various ages over 70. From an earlier investigation (Brown, McKeown, and Whitfield, 1958) the same data are available for men in the seventh decade, and by pooling the results we can examine the change in capacity from age 60.

Fig. 1 (overleaf) shows (in black) the percentage of men working full-time in each age period, and superimposed on it the percentage considered fit to work. The difference between these percentages gives (approximately) the proportion of men not working who were thought capable of doing so. (This estimate is only approximate, because a small number of men working were not considered to be fit. The proportions fit but not working were therefore a little greater than the figure suggests.)

The acceptability of these estimates turns, of course upon the reliability of the assessment of fitness. It was made by the general practitioners immediately after consideration of a man's work and its physical and mental requirements, and after a physical examination. We believe that the judgement can be accepted with fair confidence for men whose occupations were chiefly of a physical nature, or in which the mental demands—though considerable—were of a relatively simple character. It is obviously less reliable in relation to occupations which made exacting mental demands, but such occupations are relatively uncommon and probably have little effect on results based on a random sample of the general population.

The Figure suggests that in all age groups after 60–64, the proportion of men fit for full-time employment is considerably higher than the proportion actually working. The proportion working was by no means negligible, however; it was approximately one in five for men at all ages over 70, and one in twenty at ages over 80.

In assessing the services required from the community by elderly men we have examined the percentages needing medical care, technical nursing, basic nursing, and domestic help. These data were not collected in the earlier inquiry, but the increase in demand from age 70 is shown in Fig. 2 (overleaf).

For this purpose it was necessary to make an arbitrary decision about the amount of attention to be regarded as significant. In the case of medical care it was "fortnightly or more often" (a considerable proportion of the men were seen only at long intervals), but all technical nursing was included, since if needed at all it is almost invariably needed frequently (Table VII). The amounts of basic nursing and domestic help were rated as great, moderate, or trivial, and Fig. 2 is based on the first two classes. The data scarcely require detailed comment. There was little change in the need for medical care or technical nursing with increasing age, but there was a sharp rise in the level of requirement of basic nursing and domestic help. The last was indeed the only service very commonly required, not perhaps a surprising conclusion, but the scale of the demand could not have been anticipated.

It must be remembered, of course, that these observations on fitness and services are based on men living at home, and take no account of those in institutions. Men in municipal homes are probably as healthy as those at home, and no bias is introduced by their exclusion. The proportions of Birmingham men in hospitals (all types) were 2 per cent. at 70–74; 3 per cent. at 75–79; 4·4 per cent. at 80–84; and 8·6 per cent. at 85 and over. It seems reasonable to conclude that none of them was fit for full-time

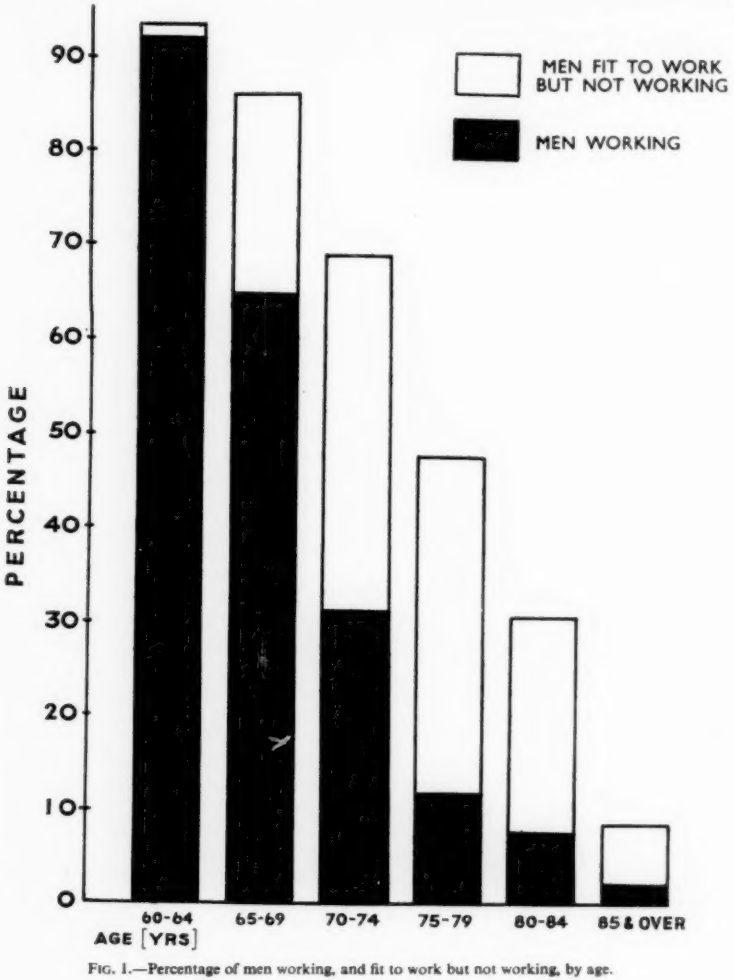

FIG. 1.—Percentage of men working, and fit to work but not working, by age.

work, but when Fig. 1 was adjusted to include them the difference was negligible, and the Figure has therefore been retained in its original form. The effect of their inclusion on our assessment of the demand for services would be somewhat greater. Almost all men of this age group in hospital need medical attention at least once a fortnight (the standard adopted in Fig. 2). Not all require technical or basic nursing, however, and consideration of need for domestic service is somewhat theoretical in the case of patients in hospital. It seems desirable therefore to regard our appraisal of service requirements as relevant to men living at home or in other institutions, and as complementary to the services provided in hospital.

Finally, it is scarcely necessary to stress that we are not suggesting that all fit men over the age of 70 should be put to work. But the conventional age of retirement has a traditional rather than a biological basis, and there are many reasons for re-considering it. Among them are the shortening of the period of working life by prolonging education and training,

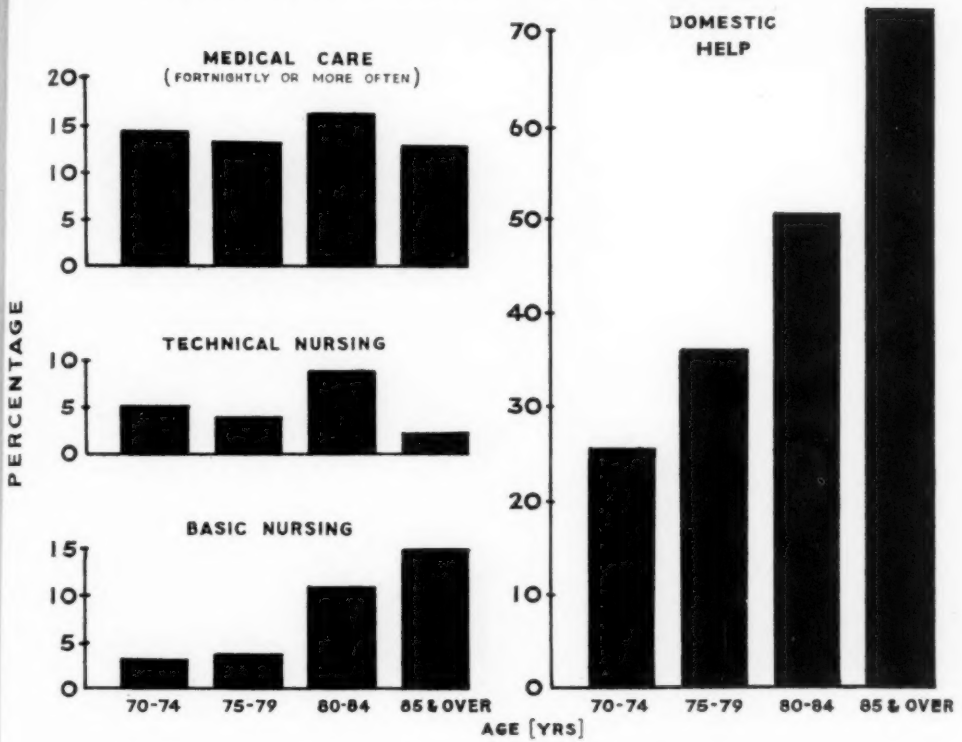

FIG. 2.—Percentage of men requiring various services, by age.

and the heavy cost of pensions and services for an increasing proportion of old people. Moreover we still know very little about the effect of retirement on health; but the fact that the incidence of coronary disease is related to physical activity (being more common in light than in heavy occupations) suggests that not all the advantages are on the side of early retirement. In these circumstances it seems desirable that we should begin to accumulate evidence about the change in ability to work with increasing age.

SUMMARY

Data recorded in respect of a representative sample of 691 men over the age of 70 on the lists of eleven Birmingham general practitioners included details of employment, an assessment of fitness for employment, and an evaluation of medical, nursing, and domestic services required for their care.

Approximately one in five of the men was in full-time employment; for ages 70–74 the proportion was one in three, and eight men over the age of 80 were still doing full-time work. The percentage working was higher in Social Class I (Professional, etc., Occupations: 29·2 per cent.) than in Class V (Unskilled Occupations: 16·5 per cent.), and the trend in the intermediate classes was regular. Approximately equal numbers of men gave "financial need" and "personal preference" as their main reason for continuing to work.

Fitness for work was assessed in relation to full-time employment. The proportion fit was two in three at ages 70–74 and one in two for the whole sample of men at all ages over 70. About half of those considered fit were fully employed. The proportion of fit men at all ages over 70 was much higher in Class I (4 in 5) than in Class V (2 in 5). The change with increasing age in the proportions fit and employed are shown in Fig. 1 (from age 60). It is suggested that the assessment of fitness, though of doubtful reliability in relation to the small number

of occupations which make exacting mental demands, can probably be accepted for the sample as a whole.

The observations on services needed by men over 70 are summarized in Tables VII and VIII. Relatively few needed much medical care or technical or basic nursing, and the only common service required was domestic help.

The inquiry was based on men living at home, and the effect of the inclusion of men in hospitals and other institutions is discussed.

We are greatly indebted to Dr. F. G. Alexander, Dr. Robert Browne, Dr. S. G. Burnie, Dr. D. L. Crombie, Dr. G. Forrest-Hay, M.B.E., Dr. W. B. Gough, Dr. R. N. E. Hinckley, Dr. J. E. Kerton, Dr. R. J. F. H. Pinsent, Dr. G. A. Readett, and Dr. J. A. H. Wiseman, who did the field work of this investigation, and to the United Birmingham Hospitals for a grant to cover the expenses.

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Brit. J. prev. soc. Med. (1959), **13**, 67–73

OBSERVATIONS ON THE GROWTH AND MATURATION OF INDIAN BOYS IN DURBAN, SOUTH AFRICA

BY

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Groups of children vary considerably in their growth and maturation. Such differences have been ascribed to nutritional, ethnic, climatic, and other factors.

This study was carried out on Indian pupils at a day school in an extremely poor "slum" neighbourhood of Durban, the social conditions of which have been described by Kark and Chesler (1956) and Abramson (1959). The majority of the boys came from Hindustani or Tamil speaking Hindu homes; most were the descendants of 19th century settlers in South Africa (Palmer, 1957).

There was a high prevalence of signs of malnutrition among the boys examined. Most boys had some degree of skin xerosis, and many showed evidence of phrynoderma, "permanent goose flesh" (Platt, 1945), glossitis, a "buccal frieze" (Corkill, 1934), lesions at the angles of the lips, a fatigue posture, or other abnormalities commonly associated with malnutrition. In 1954 a survey revealed a very high prevalence of worm infestation among the children at this school—roundworm in 83 per cent., whipworm in 86 per cent., and hookworm in 32 per cent.

The ages of the children examined ranged from 7 to 17 years. The number of boys enrolled at the school, however, showed a sharp drop from the age of 15, the numbers aged 12, 13, 14, 15, and 16 years respectively being 40, 42, 41, 26, and 12. Among Indian girls in Durban, an association has been shown between commencing adolescence and school-leaving (Kark, 1953), and it was regarded as possible (though for other reasons) that the maturer boys might also be more likely to leave school than less mature boys of the same age. Accordingly, it was possible that from the age of 15 the sample was biased; the main analyses were therefore confined to boys aged 7 to 14 years.

Methods

The boys were examined in May–June, 1952 (in the middle of the school year), in November, 1952 (towards the end of the same school year), and in May, 1953. Most boys were examined at least twice. They were weighed and measured on an Avery personal scale with a graduated metal upright and a wooden headpiece. They were clothed only in short trousers. The sexual maturity of the boys was assessed in accordance with the simple clinical criteria suggested by Ellis (1946, 1947), which take into account both genital and hair development.

The boys were classified into three categories:

(*a*) *Non-pubescent.*—Infantile or minimal genital development and no pigmented pubic hair.

(*b*) *Pubescent.*—Early genital development—growth in length of the penis or a recognizable increase in the size of the testes; or coarse pigmented pubic or axillary hair.

(*c*) *Adolescent.*—Advanced genital development (increase in girth of the penis and testes at least half the adult size); pubic hair.

In almost all cases, the boys' ages were based on official birth records. The age used was that at the child's last birthday.

A cross-sectional analysis was undertaken of the weights, heights, and maturity grades of the boys aged 7 to 14 (599 observations). In addition, a

longitudinal study was made of the weight and height increments of the 199 boys who were measured twice in the 1952 school year. The interval between the two examinations ranged from 23½ to 25½ weeks.

Results

Weight and Height.—The findings are shown in Table I and Figs 1 and 2 (opposite).

For comparison, Fig. 1 includes growth curves of London boys (Daley, 1950) and of Indian boys resident in Nairobi (Adalja, Gautama, and Sethi, 1949) and in South India (Rao, Taskar, and Ramanathan, 1954).

Fig. 2 shows the mean heights and weights of the boys in relation to their sexual maturity.

Growth Velocity.—The mean increments during a period of 23½ to 25½ weeks, between May–June and

Table II

WEIGHT AND HEIGHT INCREMENTS ATTAINED IN 5[illegible] MONTHS BY INDIAN BOYS IN DURBAN

Initial Age (yrs)	No. of Subjects	Increment			
		Weight (lb.)		Height (in.)	
		Mean	S.D.	Mean	S.D.
7*	13	3·25	—	1·23	—
8*	18	1·99	—	0·92	—
9	36	2·46	1·33	0·92	0·38
10	25	2·54	1·09	0·88	0·39
11	26	3·39	1·98	0·90	0·61
12	23	4·24	2·27	1·07	0·39
13	27	5·35	2·97	1·04	0·47
14	31	6·81	2·68	1·25	0·40

* The mean increments for boys aged 7 and 8 years (combined) were 2·52 lb. (S.D. 1·50) and 1·05 in. (S.D. 0·42).

Table I

MEAN WEIGHTS AND HEIGHTS OF INDIAN BOYS IN DURBAN

Measurement	Age (yrs)	Maturity Grade									Total Group		
		Non-pubescent			Pubescent			Adolescent					
		No.	Mean	S.D.	No.	Mean	S.D.	No.	Mean	S.D.	No.	Mean	S.D.
Weight (lb.)	7–	43	42·92	4·88							43	42·92	4·88
	8–	53	47·45	5·78							53	47·45	5·78
	9–	93	50·71	5·90							93	50·71	5·90
	10–	107	53·83	6·10							107	53·83	6·10
	11–	66	59·00	6·39	6	70·20	—				72	59·93	7·59
	12–	53	61·73	8·35	23	72·49	10·79	2	96·54	—	78	65·80	11·34
	13–	28	65·38	7·97	36	74·14	10·15	11	88·11	—	75	72·91	11·59
	14–	9	65·19	—	54	75·13	9·26	15	96·14	—	78	78·03	13·42
	15–	4	61·64	—	31	85·51	12·22	13	102·63	—			
	16–	1	55·00	—	16	91·10	—	12	104·94	—			
Height (in.)	7–	43	46·45	2·06							43	46·45	2·06
	8–	53	48·23	2·28							53	48·23	2·28
	9–	93	49·80	1·95							93	49·80	1·95
	10–	107	50·90	2·31							107	50·90	2·31
	11–	66	53·27	2·11	6	55·87	—				72	53·47	2·30
	12–	53	54·29	3·02	23	56·61	1·95	2	62·01	—	78	55·22	3·08
	13–	28	55·24	2·34	36	57·98	2·30	11	61·57	—	75	57·48	3·11
	14–	9	56·16	—	54	58·98	2·10	15	62·67	—	78	59·38	2·84
	15–	4	55·65	—	31	60·99	2·80	13	64·27	—			
	16–	1	52·20	—	16	62·05	—	12	65·09	—			

Notes: The standard deviation was not calculated for groups containing less than twenty observations.
For reasons stated in the text, the mean values for the total group were not calculated beyond the age of 14 years.

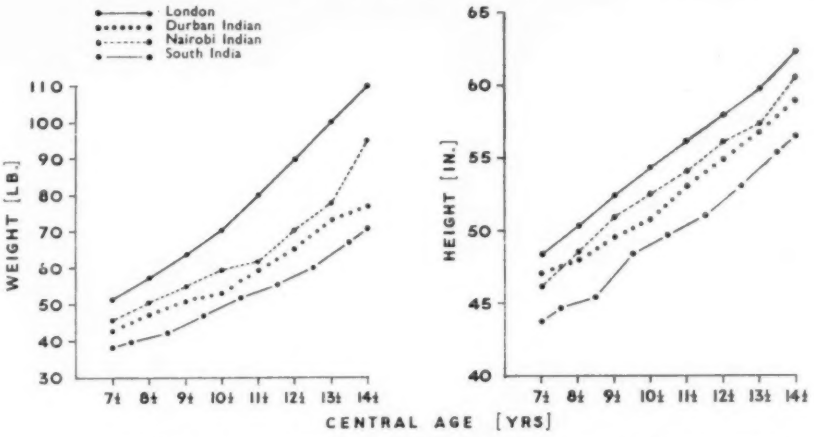

FIG. 1.—Mean weights and heights of Indian boys in Durban and of London boys and Indian boys elsewhere.

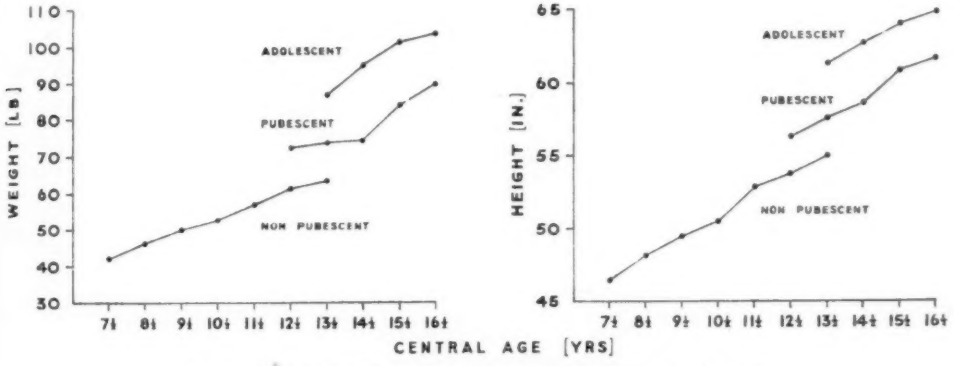

FIG. 2.—Mean weights and heights of Indian boys in Durban, by maturity grade.

November, 1957, are shown in Table II and Fig. 3 (overleaf).

Sexual Maturity.—The findings are shown in Table III and Fig. 4 (overleaf), together with comparable data for English, Nigerian, and Scottish boys (Ellis, 1948, 1950; Provis and Ellis, 1955).

DISCUSSION

The boys' measurements fall considerably short of English norms. In view of their poor nutritional state, it is likely that this is largely a reflection of nutritional influences, and that the role played by ethnic, climatic, and other factors is a secondary one. This probability is supported by comparison with the weights and heights of Indian children elsewhere. The measurements of these boys tend to be lower than those of well-nourished or privileged Indian boys, and similar to or higher than those of malnourished Indian boys. The Durban boys' weights and heights are, for example, somewhat lower than those of Indian boys in Nairobi in 1948 (Fig. 1). These Nairobi boys appear to have been in a relatively good nutritional condition. Adalja and others (1949) state that:

"With the exception of xerosis in one student and dry and rough skin in another we did not come across any manifestation of deficiency disease. Angular stomatitis, keratomalacia, Bitot's spots, etc., were

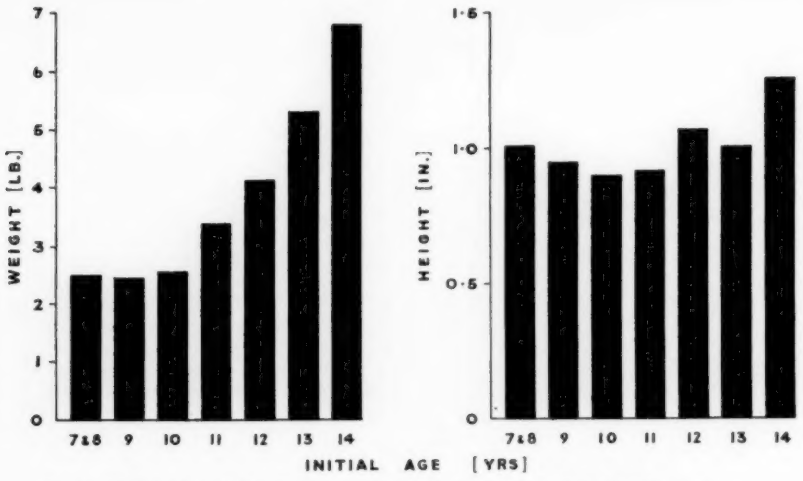

FIG. 3.—Mean weight and height increments attained by Indian boys in Durban during 5½ months.

not encountered. . . . 7·6 per cent. of children were classified from the point of view of nutrition [using a rough clinical assessment] as subnormal. We met very few cases with poor nutrition".

On the other hand, the Durban boys' weights correspond closely with those found in Nairobi boys 17 years previously (Hargreaves, 1931). The Durban heights are somewhat higher, at all ages, than those reported for the Nairobi boys in 1931.

The measurements of boys from poor and lower-middle class families in South India, such as those described by Rao and others (1954), tend to be considerably lower than those of the Durban children (Fig. 1). While it is difficult to be sure that these boys are more malnourished than the Durban boys, it is clear that their nutritional state is poor. Skin dryness, dullness, and roughness are reported in 70 per cent. of children in this region of India (Patwardhan, 1954), and the prevalence of other individual signs of malnutrition ranges from 0·5 to 15·5 per cent. (Rao and others, 1954). The weights and heights of the Durban boys appear to be superior to those of most samples of native Indian boys studied (Patwardhan, 1952), except possibly for those living in the Punjab, Bengal, and Bihar.

A comparison with published figures for Bombay schoolboys (Mehta, Mhaskar, and Vaidyanathan, 1941) yields a two-way contrast. Hindu boys from well-off homes are heavier and taller than the boys in Durban, while those from a lower economic stratum are considerably lighter and shorter. Similarly, "upper class" boys in Ceylon (Nicholls, 1951) are taller and heavier than the boys in Durban, while poorer class boys in Ceylon are shorter and lighter.

As there may be considerable ethnic and other non-nutritional differences between these various groups of Indian and Cingalese boys, such comparisons cannot prove that the weight and height differences are produced mainly by nutritional factors. They are however, in general, consistent with this thesis.

There is a well-documented relationship between growth and sexual maturation. Not only is there a well-defined growth spurt around the age of puberty, but early-maturing children tend to be larger, from early in childhood, than later-maturing children of the same age. Further, it has been shown that the greater weight of children in higher social groups can be accounted for on the assumption that they mature earlier (Hammond, 1953).

The present study provides evidence of a delay in maturation compared with that seen in groups of better-nourished non-Indian children. Unfortunately no comparable longitudinal studies of Indian children could be found.

It appears that the puberty growth-spurt starts later and reaches its peak later among these Durban boys than among British boys. There is little evidence of accelerated weight-growth before the age of 11, or of accelerated height-growth before the age of 12 (Fig. 3). The figures given by Hammond (1957)

TABLE III

SEXUAL MATURITY OF INDIAN BOYS IN DURBAN, COMPARED WITH ENGLISH*, NIGERIAN†, AND SCOTTISH‡ BOYS

Age (yrs)	Percentage of boys at each Maturity Grade											
	Non-pubescent				Pubescent				Adolescent			
	Durban	English	Nigerian	Scottish	Durban	English	Nigerian	Scottish	Durban	English	Nigerian	Scottish
9	100	100	100	100	—	—	—	—	—	—	—	—
10	100	95·0	93·5	100	—	5·0	6·5	—	—	—	—	—
11	91·7	86·5	78·8	95·0	8·3	13·5	21·2	5·0	—	—	—	—
12	67·9	64·2	57·9	77·5	29·5	35·8	40·8	22·5	2·6	—	1·3	—
13	37·3	47·4	44·4	47·1	48·0	43·7	38·9	49·4	14·7	8·9	16·6	3·5
14	11·5	12·5	17·1	21·4	69·2	39·2	48·5	60·7	19·2	48·3	34·3	17·9

* Ellis (1948) † Ellis (1950) ‡ Provis and Ellis (1955)

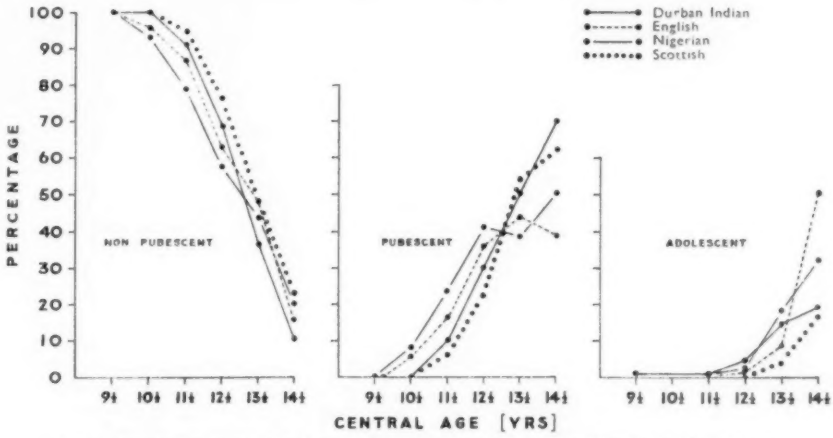

FIG. 4.—Sexual maturity of Indian boys in Durban, compared with English, Nigerian, and Scottish boys.

for British boys, however, indicate that the weight-growth of 10-year-olds is significantly greater than that of 9-year-olds ($P < 0{\cdot}02$), and that the height-growth of 11-year-olds is significantly greater than that of 10-year-olds ($P < 0{\cdot}02$). The velocity of British boys' height-growth has passed its peak by the age of 14, the height-growth of 14-year-olds being lower than that of 12- or 13-year-olds; the difference from the 12-year-olds is significant ($P < 0{\cdot}02$), while that from the 13-year-olds falls just short of significance. The height-growth of the 14-year-old Durban boys, on the other hand, is greater than that of either 12- or 13-year-olds; the difference from 12- and 13-year-olds combined is statistically significant ($P < 0{\cdot}05$). It appears from the cross-sectional data provided by Rao and others (1954) for boys in South India that the maximal growth-spurt of these children also occurs after their 14th birthday.

There is a possible fallacy in these comparisons. The British figures represent growth during a period of 12 months, while the Durban figures relate to growth during a period of 5½ months. Thus the British figure for boys whose initial age is 14 is based on boys whose final age is in some cases just below 16, whereas the corresponding Durban figure relates to boys whose final age is, at the most, just below 15½. However, though this comparative "lag" in the British figures may partly account for the differences noted, it seems unlikely that it can completely explain them.

Comparison with studies of White boys in the United States provides some support for the view that the growth-spurt of the Indian children is

delayed. In particular, it appears that the rate of height-growth in American boys tends to reach its peak earlier than in the Durban boys. Stolz and Stolz (1951), for example, found that the velocity of height-growth reached its peak at the mean age of 13·99 years. Other studies (Gray and Ayres, 1931; Simmons, 1944; Stuart and Meredith, 1946) similarly indicate that the average rate of height-growth after the 14th birthday is not greater (as in the Durban boys) but less than or similar to that which occurs immediately before the 14th birthday. This is not, however, an invariable finding (Bayley, 1956). Furthermore, it is difficult to demonstrate that the onset of the puberty growth-spurt occurs earlier in American boys than in these Durban boys. In view of this conflicting evidence, the possibility cannot be completely excluded that the delay in the Durban boys' growth-spurt is more apparent than real.

The findings in respect of sexual maturity similarly provide some indication, but no conclusive proof, of a delayed onset of puberty and a delayed adolescence. Comparable data, using the same grading method, are available for English (Ellis, 1948), Nigerian (Ellis, 1950), and Scottish boys (Provis and Ellis, 1955).

In comparison with English boys, the proportion who are non-pubescent is higher among the Durban boys until the age of 12, and the proportion who are pubescent is correspondingly lower. At age 10 this difference is statistically significant ($P < 0{\cdot}05$). Later, at age 14, the proportion of boys who are adolescent is significantly lower among the Durban boys ($P < 0{\cdot}001$) and the proportion still pubescent is correspondingly higher.

Beyond the age of 14, this difference is particularly striking. At the ages of 15 and 16, 27 and 41 per cent. respectively of the Durban boys are adolescent. The corresponding figures for English boys are 69 and 76 per cent. This difference may, however, be partly due to a tendency for more mature Durban boys of 15 and 16 to leave school, and hence to leave the sample.

There are similar discrepancies from the Nigerian findings, though only at age 10 is statistical significance reached ($P < 0{\cdot}01$).

Consideration must be given to the possibility that these differences are not real but reflect variations in the application of the grading criteria. While the method of maturity grading used is of great value in clinical practice, it is to some extent, as Ellis (1950) has said, arbitrary, and leaves room for variation between observers in the grading of border-line cases. Thus to some extent it may give different results in different hands. However, if such variations have been of a random kind, they are likely to have had little effect on the overall trend of the findings. A consistent bias, on the other hand, would be likely to have produced differences involving all ages, *e.g.* a consistently higher proportion of non-pubescent boys. It thus seems likely that, although there may have been variations in the technique of assessment, there is in fact a real difference between the maturation of these boys and that of the English and Nigerian boys.

If this is so, it may well be largely due to malnutrition. As Tanner (1955) has stated: "so far as can be ascertained from present data, neither climate nor race influence the time of adolescence as greatly as nutrition, at least where the differences in nutritional status are wide". Though there is as yet little direct evidence of the effect of nutrition on the sexual development of boys, there is much indirect evidence.

The nutritional state of the Durban boys studied was apparently poor by comparison both with the English boys studied, who were having a "liberal diet" (Ellis, 1946), and with the Nigerian boys. Ellis (1950) states that: "in general, the physique and nutrition of the [Nigerian] children appeared reasonably good", though in one group of boys (comprising 12 per cent. of the total sample), there was evidence of widespread vitamin B deficiency. The boys were relatively privileged children. Ellis does not describe their physical growth, but children of the same ethnic groups (Ibo and Yoruba) living elsewhere in Nigeria, are considerably taller and heavier than the Durban boys (Nicol, 1956).

A recent study of Edinburgh boys, on the other hand, indicates that these children, who are presumably much better nourished than the Durban children, mature later. As Fig. 4 indicates, fewer Edinburgh boys than Durban boys are more mature at ages 11 to 14. Though this difference is significant only at age 13 ($P < 0{\cdot}02$), the trend is a consistent one.

This finding must be either the effect of a bias in the application of the grading techniques, or the outcome of factors other than nutritional. Provis and Ellis (1955) make no comment on the possible reasons for the apparent discrepancy between the rate of maturation of Scottish and English children.

Apart from this single discordant finding, the results that have been described are in general not inconsistent with the thesis that the malnutrition of the Indian boys manifests itself in poor growth and delayed maturation. It may be noted that it has been found among Indian girls in Durban that the less privileged children have a significantly later menarche than those from better-off families (Kark, 1956). The age at menarche of Indian girls in

Durban as a whole tends to be later than that of middle and upper class groups in the United States, similar to that of underprivileged American groups, and earlier that that of four out of six groups of native Indian and Cingalese girls (Kark, 1953).

The association found in these boys between malnutrition, poor growth, and indications of delayed maturation is consistent with a largely nutritional explanation for these latter phenomena. However, in view of the reservations which have been discussed, this conclusion should be treated with caution. A full evaluation of the significance of the findings must wait on similar studies of Indian boys elsewhere, or of better-nourished Indian boys in Durban itself.

Summary

Observations were made of the weight, height, and sexual maturity of a group of malnourished Indian schoolboys in Durban, South Africa. The sexual maturity of the boys was graded in accordance with the criteria suggested by Ellis. Comparisons were made with data for Indian and other boys elsewhere.

The boys were found to be shorter and lighter than English boys. Their weights and heights tended to be lower than those of privileged or better-nourished Indian boys elsewhere, and similar to or higher than those of malnourished Indian boys elsewhere.

There was evidence suggesting that the puberty growth-spurt began later than among British boys, and that it reached its peak later than among British boys and possibly later than among boys in the United States.

Puberty occurred later than among English and privileged Nigerian boys, but sexual maturation appeared to occur earlier than among Edinburgh boys.

Apart from this last finding, the results indicate an association in Indian boys in Durban between malnutrition, poor growth, and delayed maturation, and are in general consistent with a largely nutritional explanation for these latter phenomena.

I am indebted to Professor S. L. Kark and Dr. E. Kark for their interest and criticism, to Medical Aide E. C. Jali for his assistance with the measurements, to Mrs. K. M. Wolfson for the charts, and to the school authorities and the boys for their cooperation.

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INCAPACITY FOR WORK AMONG THE INSURED POPULATION OF GREAT BRITAIN

BY

G. MARY JONES

The Ministry of Pensions and National Insurance

The Ministry of Pensions and National Insurance usually receives between eight and nine million new claims for sickness and injury benefits in a year and records certified incapacity for work totalling nearly 300 million days. Detailed analyses are made from the records of spells of incapacity for work in respect of 5 per cent. of the insured population. These analyses are designed to show the extent and causes of incapacity, as given on the medical certificates, among different age groups and in different areas: broadly they show the position over the course of a year running from the first Monday in June, and at the end of the period. Illnesses which do not cause incapacity for work are not covered, and very short spells of incapacity lasting less than 4 days do not normally attract payment of benefit and are commonly not reported to the Ministry. To that extent the Tables are deficient as an indication of the extent of illness among insured persons.

The latest analyses* are in respect of the years from June 7, 1954, to June 4, 1955, and from June 6, 1955, to June 2, 1956, and the Tables and Charts which follow illustrate the position shown by the figures in one or both of those periods.

TABLE IA

HOME POPULATION AGED 15-69 (MALES) AND 15-64 (FEMALES) IN DECEMBER 1955, SHOWING ESTIMATED NUMBERS INSURED FOR SICKNESS AND INJURY BENEFITS (MILLIONS)

Sex		Total	Not Insured (1)	Insured for:		
				Sickness Benefit Only (2)	Sickness and Injury Benefits (3)	Injury Benefit Only (4)
Male		16·70	1·62	1·30	13·68	0·10
Female	Married	11·60	7·79	0·33	1·42	2·06
	Other	5·21	1·29	0·14	3·61	0·17

(1) Non-employed, including students, housewives, and retired persons; and members of the armed forces in Great Britain.

(2) Self-employed, and people who have recently given up gainful employment but retain residual rights to benefit.

(3) Employed persons other than those included in (4). The figures include civil servants (460,000 men, 30,000 married women, and 130,000 other women) who do not normally claim sickness or injury benefit during the first 6 months of incapacity for work and who are therefore excluded from the "population at risk figures" in Table IB.

(4) Employed married women who choose not to be insured for sickness benefit and certain widows with a similar option; also late age entrants contributing for injury benefit and retirement pension only, and employed retirement pensioners.

SCOPE OF THE FIGURES

The people represented in, and excluded from, the analyses are indicated in Table IA and IB, and Fig. 1(*a*) (opposite).

Broadly, the analyses cover incapacity for work by reason of sickness among gainfully occupied civilian men between the ages of 15 and 69. They do not

TABLE IB

PROPORTION* OF THE POPULATION IN EACH QUINQUENNIAL AGE GROUP AT RISK FOR SICKNESS BENEFIT†

Quinquennial Age Groups (at 31.12.55)	Males			Females		
	Number in Age Group (thousands)	At Risk for Sickness Benefit		Number in Age Group (thousands)	At Risk for Sickness Benefit	
		Thousands	Per cent.		Thousands	Per cent.
15–19	1,545	1,021	66·1	1,581	1,209	76·5
20–24	1,527	1,173	76·8	1,579	1,080	68·4
25–29	1,664	1,560	93·7	1,671	570	34·1
30–34	1,812	1,682	92·8	1,836	368	20·0
35–39	1,647	1,530	92·9	1,703	301	17·7
40–44	1,787	1,672	93·6	1,857	372	20·0
45–49	1,799	1,745	97·0	1,852	437	23·6
50–54	1,649	1,578	95·7	1,758	470	26·7
55–59	1,331	1,243	93·4	1,582	416	26·3
60–64	1,072	993	92·6	1,395	124	8·9
65–69	867	323	37·3	—	—	—
All Ages	16,700	14,520	86·9	16,814	5,347	31·8

* Based on average population at risk between June, 1955, and June, 1956.

† Including those entitled to contribution credits only.

* "Digest of Statistics Analysing Certificates of Incapacity, 1954–55 and 1955–56"; available to research workers on application to the Ministry of Pensions and National Insurance (Division C.3), 10 John Adam Street, London, W.C.2.

cover men in the armed forces, students, or retired persons; or certain men aged 65–69 who were late entrants to insurance; or people who have never worked. As the chart shows, the proportion not covered for sickness benefit is small, and Fig. 1(*b*) indicates that the majority of exclusions are at the upper and lower ends of the age range. All employed men, whatever their age, are insured for industrial injuries.

Among women aged 15–64, the proportion represented in statistics of sickness benefit is relatively small, especially from age 25 onwards. Among single women the exclusions are the same as among the men, but gainfully occupied married women can choose whether or not to pay contributions, and in 1956 little more than one-third of those in employment chose to do so. A similar option is also available to certain widows. Housewives are not covered

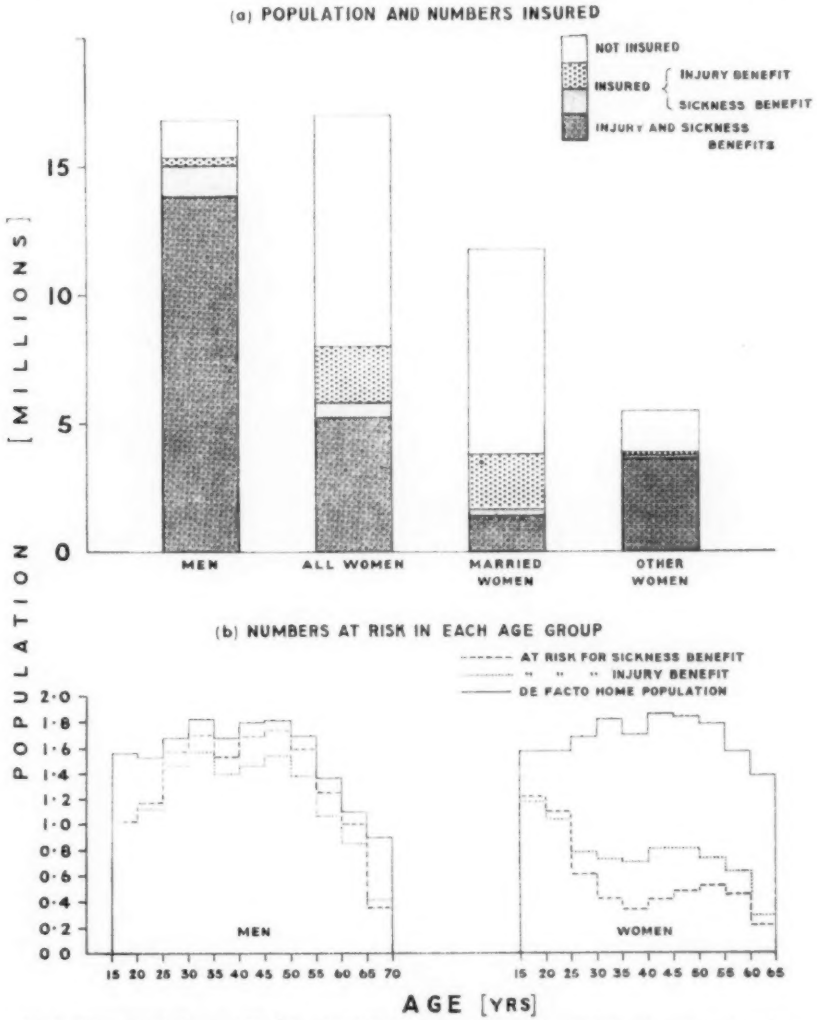

FIG. 1.—Home population aged 15–69 (men) and 15–64 (women) in December, 1955, showing estimated numbers insured for sickness and injury benefits and average numbers at risk in each age group.

except in so far as they may retain a right to benefit for a period immediately after ceasing employment. All employed women are insured for industrial injuries.

Under their sick pay arrangements, civil servants though insured, do not normally claim National Insurance sickness or injury benefits for incapacity lasting less than 6 months, and as such incapacity is not included in the Tables they are excluded from the population at risk. No one aged 70 or over (65 for women) is insured for sickness benefit. At the other end of the age range, new entrants to insurance have to pay 26 contributions before becoming eligible for benefit, but while these contributions are being paid they are usually entitled to have contributions credited for periods of incapacity, and if medical certificates are submitted for this purpose, their illnesses are included in the Tables.

Sickness Benefit

The numbers insured, the numbers drawing benefit, and the extent of claims are indicated in Table II.

The pattern of claiming was similar in both years under review. Of those at risk, 28 per cent. of the men and 32 per cent. of the women claimed benefit, most of them once only; the proportion making two claims amounted to 5 per cent. of the men and 6 per cent. of the women, while in both only 2 per cent. claimed three times or more. The number of days of incapacity recorded in each year per person at risk amounted to about thirteen for men and between 16 and 17 for women.

Table III (opposite) shows how long the claimants had been incapacitated at quarterly dates in 1954–55.

Even in the winter months, when short-term claims were at their highest level, the proportion of men who had been incapacitated for 6 months or more did not fall below a third of the total number registered, and over the year the average was about 40 per cent; the proportion incapacitated for 2 years or more varied in the year from one-fifth to just over one-quarter. The proportions were higher among women than among men. The actual numbers incapacitated for long periods varied little. The number of men who had been incapacitated for longer than 6 months remained close to 250,000, of whom 150,000 had been incapacitated for over 2 years; corresponding figures for women varied only from about 135,000 to 141,000 over 6 months, of whom some 92 to 96,000 had been incapacitated for over 2 years.

Table II

SICKNESS BENEFIT: EXTENT OF CLAIMS IN THE PERIODS FROM JUNE 7, 1954, TO JUNE 4, 1955, AND FROM JUNE 6, 1955, TO JUNE 2, 1956

Sex	Male		Female	
Year	1954–55	1955–56	1954–55	1955–56
(1) Average Population at Risk (thousands)	14,384	14,520	5,407	5,347
(2) (*a*) Persons Claiming* in Period (thousands)				
(*i*) Total	4,031	4,074	1,754	1,695
(*ii*) Claimed once only	3,016	3,021	1,309	1,255
(*iii*) Claimed twice	719	734	334	324
(iv) Claimed three times or more	295	319	111	115
(2) (*b*) Persons Claiming per 100 at Risk—				
(*i*) Total	28·0	28·1	32·4	31·7
(*ii*) Claimed once only	21·0	20·8	24·2	23·5
(*iii*) Claimed twice	5·0	5·1	6·2	6·1
(*iv*) Claimed three times or more	2·1	2·2	2·1	2·2
(3) Spells of Incapacity Commencing in Period—				
(*a*) Number of spells (thousands)	4,984	5,148	2,054	2,036
(*b*) Spells per 100 at risk	35	35	38	38
(4) Spells of Incapacity Current at Some Time in Period*—				
(*a*) Number of spells (thousands)	5,526	5,671	2,347	2,290
(*b*) Average number of spells per claimant	1·37	1·39	1·34	1·35
(5) Days† of Incapacity Recorded in Period—				
(*a*) Number of days (thousands)	186,507	187,691	90,261	87,586
(*b*) Days per person at risk	13	13	17	16
(*c*) Days per spell current at some time in period	34	33	39	38
(6) Spells of Incapacity Terminating in Period—				
(*a*) Number of spells (thousands)	5,006	5,163	2,075	2,045
(*b*) Median duration of spells (days)	12	12	13	13

* For 1954–55 these figures are based on the analysis of a sub-sample equal to about 1 per cent. of the whole.
† Week-days: 6 days = one week; 312 days = one year.

Variations with Age

As might be expected, the incidence of incapacity varied with age (Table IV, opposite, and Fig. 2, overleaf). Among men aged 15–24, a slightly higher proportion were incapacitated at some time in the year than at higher ages under 50. The lowest proportion was in the age range from 25–29, and there was little variation from 30–44, but from then onwards the proportion increased rapidly and the maximum of 41 per hundred persons at risk in the age range 60–64 was some 70 per cent. higher than the minimum of 24 per hundred between the ages of 25–29. The increase with age in the proportion of persons

TABLE III

NUMBERS OF CLAIMANTS INCAPACITATED AT QUARTERLY DATES ANALYSED BY DURATION OF SPELL AT THOSE DATES

Claimants		Sex	Dates			
			September 4, 1954	December 4, 1954	March 5, 1955	June 4, 1955
Number Incapacitated		Male	547,900	665,400	752,900	569,900
Percentage Incapacitated for Duration Shown	Up to 1 mth		30	42	42	31
	Over 1 mth		70	58	58	69
	Over 3 mths		55	44	41	53
	Over 6 mths		47	38	33	44
	Over 1 yr		37	31	27	36
	Over 2 yrs		27	22	20	26
	Over 4 yrs		17	14	13	17
	Over 6 yrs		10	9	8	11
Number Incapacitated		Female	283,100	313,900	328,300	262,300
Percentage Incapacitated for Duration Shown	Up to 1 mth		30	38	37	28
	Over 1 mth		70	62	63	72
	Over 3 mths		57	50	48	59
	Over 6 mths		50	44	42	52
	Over 1 yr		42	37	36	44
	Over 2 yrs		34	30	28	35
	Over 4 yrs		26	22	21	26
	Over 6 yrs		19	17	16	20

TABLE IV

EXTENT OF INCAPACITY FOR WORK IN DIFFERENT AGE GROUPS

Extent of Incapacity	Sex	Year	Age at December 31										All Ages*
			15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	
Average Population at Risk (thousands)	Male	1954–5	1,000	1,178	1,566	1,749	1,447	1,695	1,727	1,538	1,182	977	14,384
		1955–6	1,021	1,173	1,560	1,682	1,530	1,672	1,745	1,578	1,243	993	14,520
	Female	1954–5	1,206	1,080	575	382	302	391	455	472	415	—	5,407
		1955–6	1,209	1,080	570	368	301	372	437	470	416	—	5,347
Number of Days of Incapacity in Period (thousands)	Male	1954–5	5,530	8,143	10,866	13,433	12,290	16,072	19,746	25,137	30,183	37,859	186,510
		1955–6	5,329	7,690	10,077	12,715	12,636	15,960	20,074	25,016	31,328	39,505	187,691
	Female	1954–5	8,695	11,302	7,623	6,627	5,376	7,912	10,966	13,650	16,252	—	90,260
		1955–6	8,144	11,188	6,974	5,844	5,687	7,384	10,561	13,508	16,442	—	87,586
Number of Spells of Incapacity Commencing in Period (thousands)	Male	1954–5	340·3	406·3	498·3	567·9	465·2	528·0	562·0	564·9	485·2	420·3	4,983·6
		1955–6	336·5	410·1	500·9	569·3	501·4	542·6	576·9	590·7	529·1	442·4	5,148·2
	Female	1954–5	491·6	457·9	202·6	140·9	111·3	139·6	165·2	169·6	141·0	—	2,053·5
		1955–6	482·3	458·4	201·1	131·1	117·2	136·8	162·0	168·9	144·0	—	2,035·7
Persons Incapacitated at Some Time in Period (thousands)	Male	1954–5	265·4	319·7	375·0	428·5	355·1	414·8	455·9	462·4	425·9	398·2	4,030·5
		1955–6	266·4	313·9	372·7	416·8	375·4	416·0	452·5	472·9	442·5	409·4	4,074·4
	Female	1954–5	380·4	358·7	174·7	115·9	90·3	124·6	151·1	165·2	154·4	—	1,754·0
		1955–6	360·4	348·0	162·2	108·4	98·3	116·7	146·6	161·7	155·9	—	1,694·9
Days of Incapacity in Period, per 100 Persons at Risk	Male	1954–5	553	691	694	768	849	948	1,143	1,634	2,554	3,875	1,300
		1955–6	522	656	646	756	826	955	1,150	1,585	2,520	3,978	1,290
	Female	1954–5	721	1,046	1,326	1,735	1,780	2,024	2,410	2,892	3,916	—	1,670
		1955–6	674	1,036	1,224	1,588	1,889	1,985	2,417	2,874	3,952	—	1,640
Spells of Incapacity Commencing in Period, per 100 Persons at Risk	Male	1954–5	34	34	32	32	32	31	33	37	41	43	35
		1955–6	33	35	32	34	33	32	33	37	43	45	35
	Female	1954–5	41	42	35	37	37	36	36	36	34	—	38
		1955–6	40	42	35	36	39	37	37	36	35	—	38
Persons Incapacitated at Some Time in Period, per 100 Persons at Risk	Male	1954–5	27	27	24	24	25	24	26	30	36	41	28
		1955–6	26	27	24	25	25	25	26	30	36	41	28
	Female	1954–5	32	33	30	30	30	32	33	35	37	—	32
		1955–6	30	32	28	29	33	31	34	34	37	—	32

* Including men over age 65 and women over age 60.

incapacitated in the course of the year was accompanied by a rise in the number of spells commencing in the period as well as in the number of days of incapacity recorded.

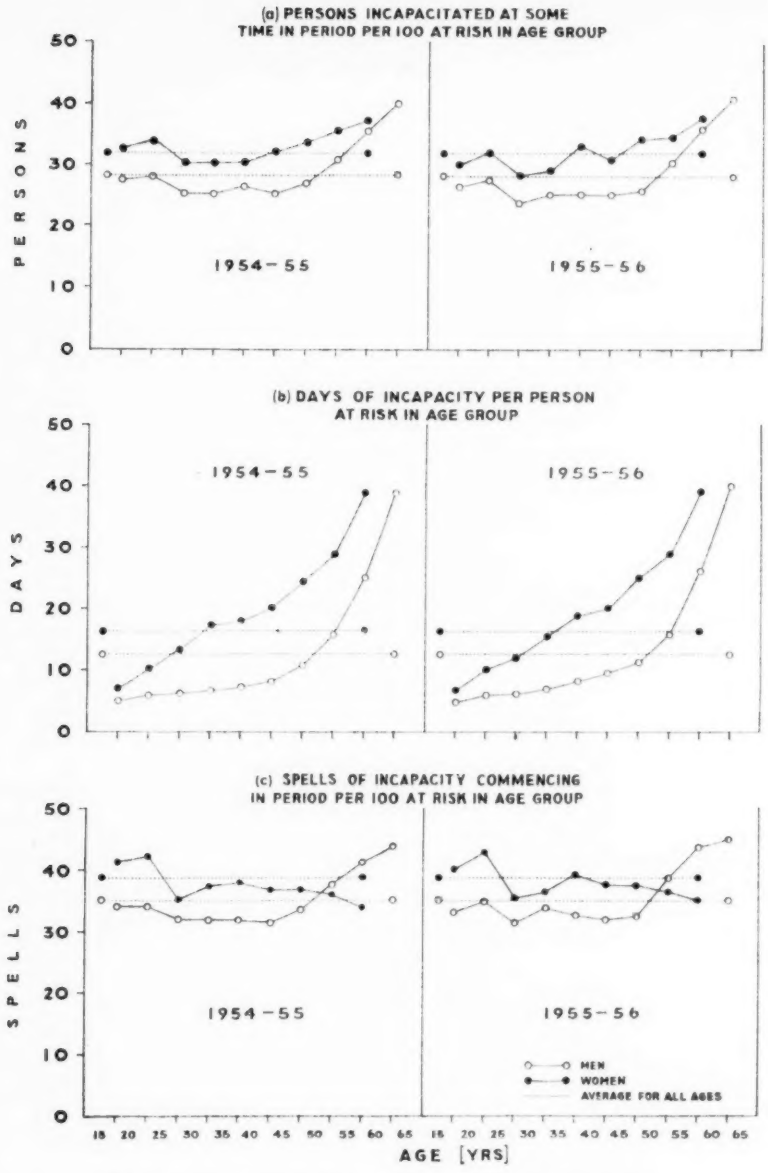

FIG. 2.—Extent of incapacity for work due to sickness in different age groups.

Among women the proportion incapacitated was at all points higher than among men. There was the same tendency towards a slightly higher proportion of claimants in the first 10 years of insurance, a not very consistent pattern in the age range 25–39, and a definite trend upwards from age 40 onwards, the curve rising less steeply than among the men so that the maximum of 37 per hundred at risk in the age range 55–59, which was about the same proportion as was found among men of the same age, was only between a quarter and a third higher than the minimum of 30 (in 1954–55) or 28 (in 1955–56) per hundred at risk in the age range 25–29. However, the number of spells of incapacity per hundred at risk fell gradually from about age 35 onwards and was actually less than among men after age 50. The average number of days of incapacity showed the same steep rise as among the men.

The implication that the average duration of incapacity among women over the years followed a different pattern from that of the men, is borne out by Fig. 3 (overleaf) and Table V, which illustrate the proportions of the populations at risk in different age groups which had been incapacitated for one day or more, 6 months or more, and 2 years or more, on June 2, 1956. From age 30 onwards the prevalence of chronic illness was higher among both single and married women than among men aged 50–54; from age 55 the prevalence of chronic illness among men increased steeply but at higher ages the prevalence of illnesses which had lasted at least 6 months among women remained higher than among men 5 years older.

TABLE V

NUMBERS OF MEN, MARRIED WOMEN, AND OTHER WOMEN IN EACH AGE GROUP* INCAPACITATED ON 2nd JUNE 1956, EXPRESSED AS A PERCENTAGE OF THE CORRESPONDING AVERAGE POPULATION AT RISK FOR THE PERIOD 6th JUNE 1955–2nd JUNE 1956 INDICATING DURATION OF INCAPACITY

Sex		Male			Female					
					Married			Other		
Duration of Incapacity		1 Day or More	6 Mnths or More	2 Yrs or More	1 Day or More	6 Mnths or More	2 Yrs or More	1 Day or More	6 Mnths or More	2 Yrs or More
Number of Persons of All Ages (thousands)		553	234	143	111	52	37	155	75	54
Numbers per Thousand Persons at Risk in Each Age Group	All Ages	3·81	1·61	0·99	6·43	3·01	2·16	4·27	2·06	1·48
	15–19	1·63	0·16	0·02	5·80	0·26	—	2·14	0·26	0·06
	20–24	1·97	0·39	0·14	3·87	0·64	0·27	2·41	0·66	0·34
	25–29	1·82	0·43	0·21	3·97	1·33	0·87	3·19	1·31	0·92
	30–34	2·21	0·61	0·37	5·12	2·16	1·63	4·23	2·13	1·56
	35–39	2·50	0·74	0·45	6·79	3·05	2·21	5·24	2·75	2·05
	40–44	2·81	0·94	0·60	6·83	3·15	2·36	5·73	3·06	2·28
	45–49	3·39	1·29	0·80	8·07	4·26	3·25	6·97	4·13	3·18
	50–54	4·72	2·06	1·29	9·30	5·76	4·08	8·90	5·66	4·33
	55–59	7·82	4·12	2·64	13·04	8·93	6·79	11·10	7·94	6·20
	60–64	11·78	7·38	4·72	—	—	—	—	—	—

* Age at December 31, 1955.

TABLE VI

REGIONAL ANALYSIS OF MEN CLAIMING SICKNESS BENEFIT

Country and Region		Estimated Average Number at Risk (thousands)	Incapacitated in the Period June 6, 1955, to June 2, 1956		Incapacitated on June 2, 1956	
			Thousands	Per cent.	Thousands	Per cent.
Great Britain		14,520	4074·4	28	552·9	3·8
England	London & South-East	3,348	768·2	23	95·5	2·9
	Eastern	857	221·2	26	27·8	3·2
	Southern	726	177·4	24	22·4	3·1
	South Western	809	220·6	27	30·9	3·8
	Midland	1,432	362·6	25	48·0	3·4
	North Midland	1,045	293·1	28	35·0	3·4
	East & West Ridings	1,255	395·2	31	52·5	4·2
	North Western	1,928	572·8	30	82·7	4·3
	Northern	932	329·2	35	45·5	4·9
	Total	12,332	3340·2	27	440·2	3·6
Scotland		1,455	455·1	31	66·9	4·6
Wales		732	276·0	38	45·3	6·2

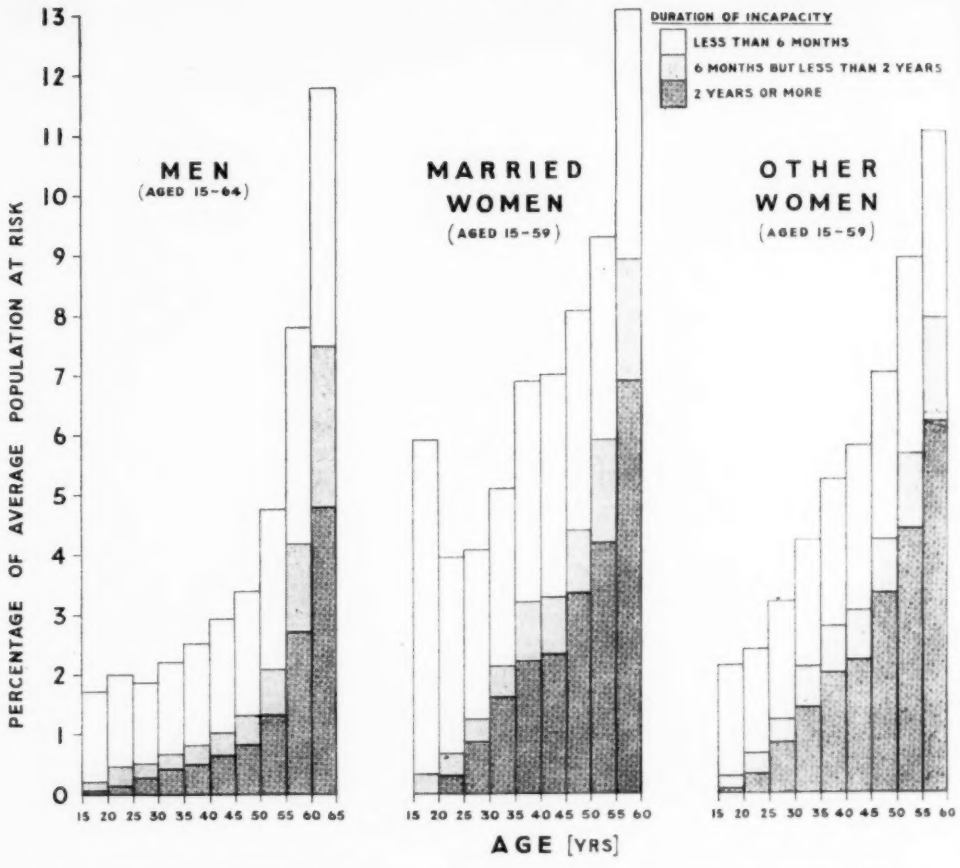
DURATION OF INCAPACITY
LESS THAN 6 MONTHS
6 MONTHS BUT LESS THAN 2 YEARS
2 YEARS OR MORE
MEN
(AGED 15-64)
MARRIED WOMEN
(AGED 15-59)
OTHER WOMEN
(AGED 15-59)
PERCENTAGE OF AVERAGE POPULATION AT RISK
0 1 2 3 4 5 6 7 8 9 10 11 12 13
15 20 25 30 35 40 45 50 55 60 65
15 20 25 30 35 40 45 50 55 60
15 20 25 30 35 40 45 50 55 60
AGE [YRS]

FIG. 3.—Persons incapacitated on June 2, 1956. Numbers of men, married women, and other women expressed as a percentage of the average population at risk in the relevant age group in the year ending on that day. The shading indicates duration of incapacity up to that time.

VARIATIONS IN DIFFERENT AREAS

The amount of incapacity for work varied in different parts of the country. The distribution of insured women between standard Regions is not known, because the proportion electing not to be insured varies in different areas and this proportion is not measured, but for men the numbers of persons recorded as incapacitated per 100 at risk in each Region has been estimated and is shown separately in Fig. 4 (opposite) and Table VI (p. 79). The causes of differences are probably complex, and the figures are not necessarily a measure of different levels of morbidity.

For instance, when an illness or injury is relatively slight, ability to work may depend on the physical requirements of a man's occupation, and the geographical distribution of occupations with widely different physical requirements may affect rates of incapacity for work in different areas without necessarily meaning that there is more or less "illness"—in the wider sense—in those areas. Similar considerations may influence the length of time needed for recovery from more serious illnesses.

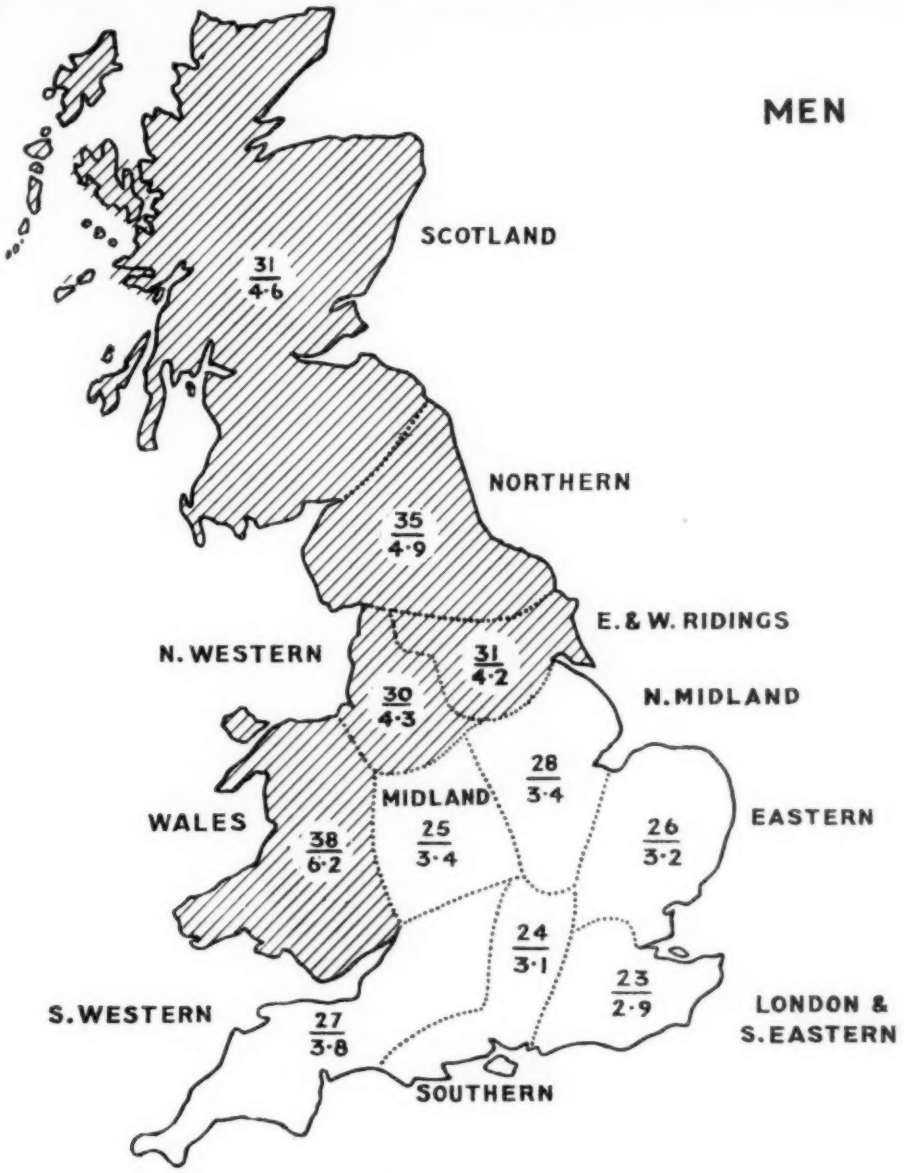

FIG. 4.—Persons incapacitated per 100 at risk in each Standard Region. Above the line, numbers incapacitated at some time in the year; below the line, numbers incapacitated on June 2, 1956. The area above the average is shaded.

TABLE VII

DAYS OF INCAPACITY FOR WORK* ANALYSED BY MAIN CAUSES

Cause of Incapacity for Work	W.H.O. Detailed List Numbers of Causes	Days of Incapacity for Work Attributed to Those Causes (millions)					
		1954–55			1955–56		
		Males and Females	Males	Females	Males and Females	Males	Females
Total All Causes		276·77	186·51	90·26	275·28	187·69	87·59
Infective and Parasitic Diseases							
Tuberculosis	001–019	23·55	14·85	8·70	20·99	13·49	7·50
Other	020–138	3·02	1·90	1·12	3·09	1·94	1·14
Neoplasms†	140–239	1·90	1·24	0·66	1·96	1·26	0·69
Allergic Disorders							
Asthma	241	4·19	2·78	1·41	4·19	2·77	1·42
Other	240, 242–5	0·27	0·15	0·12	0·29	0·16	0·13
Diabetes mellitus	260	1·54	0·90	0·64	1·58	0·93	0·65
Anaemias	290–3	2·64	0·64	2·00	2·54	0·64	1·90
Psychoneuroses and Psychoses	300–18	23·77	14·40	9·37	25·11	15·18	9·94
Diseases of the Central Nervous System, Multiple sclerosis, Cerebral paralysis, Epilepsy, etc.	330–357	11·60	8·09	3·51	11·94	8·41	3·52
Sciatica	363	1·48	1·15	0·33	1·54	1·19	0·36
Diseases of the Eye	370–89	3·43	2·44	0·99	3·30	2·31	0·99
Diseases of the Ear and Mastoid Process	390–8	1·37	0·89	0·47	1·40	0·94	0·45
Diseases of the Circulatory System							
Chronic rheumatic heart disease	410–416	1·24	0·45	0·79	1·11	0·41	0·70
Arteriosclerotic and degenerative heart disease	420–2	10·98	8·87	2·11	11·17	9·14	2·03
Other diseases of the heart	430–434	5·00	3·50	1·50	4·95	3·52	1·43
Hypertensive disease	440–7	6·74	3·68	3·06	6·92	3·85	3·08
Other diseases of the circulatory system	400–2, 467–8, 450–6	2·32	1·74	0·58	2·29	1·73	0·56
Diseases of Veins	460–466	4·23	2·75	1·48	4·13	2·62	1·51
Diseases of the Respiratory System							
Common cold	470	3·64	2·33	1·31	3·81	2·49	1·31
Influenza	480–3	14·85	10·45	4·40	12·63	9·30	3·34
Bronchitis	500–502	25·38	20·40	4·99	26·87	21·88	4·99
Other	471–5, 490–3, 510–27	15·72	11·32	4·39	16·85	12·40	4·45
Diseases of the Digestive System							
Ulcer of stomach or duodenum	540–1	6·61	5·78	0·83	6·04	5·29	0·75
Gastritis and duodenitis	543	4·15	3·09	1·06	4·15	3·08	1·07
Other diseases of stomach and duodenum (except cancer)	542, 544–5	3·15	2·61	0·54	3·23	2·63	0·60
Appendicitis	550–3	2·50	1·36	1·15	2·38	1·32	1·05
Hernia of abdominal cavity	560–1	2·70	2·45	0·25	2·70	2·44	0·26
Diarrhoea and enteritis	571, 764	2·05	1·33	0·73	2·25	1·53	0·73
Other	530–9, 570, 572–87	3·12	1·96	1·17	3·24	2·01	1·22
Diseases of the Genito-urinary System	590–637	6·41	2·75	3·66	6·62	2·84	3·78
Diseases of the Skin and Cellular Tissue	690–8	3·82	2·74	1·08	3·93	2·84	1·09
Diseases of the Bones and Organs of Movement							
Arthritis	720–5	10·89	6·09	4·79	11·09	6·19	4·90
Rheumatism, except rheumatic fever	726–7	10·74	7·23	3·51	9·86	6·73	3·13
Displacement of intervertebral disk	735	1·85	1·37	0·48	2·07	1·57	0·50
Other	730–4, 736–49	3·02	2·12	0·90	3·02	2·12	0·90
Nervousness, Debility, Headache	790–1	2·90	1·34	1·57	2·71	1·30	1·40
Surgical or Hospital Treatment, not Otherwise Specified	795 (Part)	4·83	2·82	2·01	5·40	3·28	2·12
Other Diseases	270–7, 287–9, 294–9 320–6, 780–9, 792–5 (Part)	14·80	9·92	4·87	12·38	8·62	3·76
Accidents, Poisonings, and Violence	N800–999	15·74	12·46	3·28	16·36	12·98	3·38

* Monday to Saturday, *i.e.* six days equals one week; 312 days equal one year. † For obvious reasons, these figures understate the position.

CAUSES OF INCAPACITY

The incapacitating causes shown in the medical certificates supporting the claims for sickness benefit are coded according to the World Health Organisation's "International Statistical Classification of Diseases, Injuries, and Causes of Death". Table VII (opposite) shows the main causes of incapacity among the working population. Differences in this Table in the proportionate amount of incapacity due to different groups of causes may indicate real variations between the sexes but do not necessarily do so, because of the widely different age structure in the populations at risk among men and women respectively. The incidence at different ages of certain causes, all responsible for a substantial number of days of incapacity in the course of a year, is therefore shown in Table VIII.

For most of the conditions shown in Table VIII the pattern was, in fact, different for men and for women. For example, in the case of tuberculosis

TABLE VIII

NUMBER OF CLAIMANTS INCAPACITATED AT BEGINNING OF JUNE ANALYSED BY AGE AND SELECTED CAUSES OF INCAPACITY AND EXPRESSED AS A PROPORTION OF THE AVERAGE POPULATION AT RISK IN EACH AGE GROUP

		Sex	Year	Age at December 31*					
				Up to 24	25–34	35–44	45–54	55–59	60–64
		Male	1954–5	2,178	3,315	3,142	3,265	1,182	977
			1955–6	2,194	3,242	3,202	3,323	1,243	993
		Female	1954–5	2,286	957	693	927	415	—
			1955–6	2,289	938	673	907	416	—
Persons Incapacitated at End of Statistical Year (in June) per 10,000 at Risk ..	All Causes	Male	1955	181	210	271	423	810	1,166
			1956	181	202	266	402	782	1,178
		Female	1955	249	419	575	835	1,163	—
			1956	262	397	602	828	1,186	—
	Tuberculosis of Respiratory System	Male	1955	23	28	29	30	39	
			1956	17	22	26	28	38	40
		Female	1955	37	82	51	22	23	—
			1956	29	66	52	22	21	—
	Psychoneurosis and Psychosis	Male	1955	11	26	32	36	57	
			1956	12	27	34	38	54	66
		Female	1955	15	57	87	106	114	—
			1956	15	59	101	114	121	—
	Arteriosclerotic and Degenerative Heart Disease ..	Male	1955	—	1	4	18	92	
			1956	—	1	3	18	61	119
		Female	1955	1	4	10	28	60	—
			1956	1	3	13	27	65	—
	Hypertensive Disease ..	Male	1955	—	—	1	8	38	
			1956	—	—	1	7	28	58
		Female	1955	—	1	8	43	107	—
			1956	1	2	10	43	119	—
	Bronchitis	Male	1955	6	7	16	45	149	
			1956	4	7	14	39	176	196
		Female	1955	9	16	27	43	64	—
			1956	8	13	32	49	70	—
	Arthritis	Male	1955	1	3	6	16	48	
			1956	1	2	5	14	33	65
		Female	1955	2	7	24	70	139	—
			1956	1	6	25	73	143	—
	Rheumatism	Male	1955	4	7	13	20	31	
			1956	5	8	13	16	25	28
		Female	1955	7	14	27	44	59	—
			1956	8	20	21	34	53	—

* *e.g.* in the case of persons incapacitated on June 4, 1955, age at December 31, 1954.

(causing 23½ million days of incapacity in the year), the prevalence rose with age among the men but fell among the women. Another illness attacking young women more than young men but older men more than older women is bronchitis, which was responsible for more incapacity in the year than tuberculosis (over 25 million days). In this instance the disease was more prevalent among women up to about 45 and there was little difference between men and women in the next decade, but though it became increasingly prevalent among older women the prevalence among men aged 55–59 was more than twice as great as that among women of the same age. Over the whole age range up to 60 the prevalence of bronchitis increased between seven and eight times in women and between thirty and forty times in men. On the other hand, psycho-neuroses and psychoses (responsible for nearly 24 million days of incapacity in a year), hypertensive diseases (nearly 7 million), and rheumatism and arthritis (nearly 22 million) increased in prevalence with age more among women than among men.

Industrial Injury Benefit

In the course of the year 1954–55, industrial injury benefit was paid for incapacity covering 18·76 million days, and in 1955–56 the corresponding figure was 19·42 million. The numbers of industrial accidents and the varying incidence of accidents at different ages are indicated in Table IX. The total amount of incapacity for work attracting payment of injury benefit and the incidence of the main external causes in different industries are shown in Table X (overleaf). These Tables do not include certain long-term and some recurrent forms of incapacity arising from industrial accidents and prescribed industrial diseases, *i.e.* where sickness benefit is paid for days of incapacity falling outside the injury benefit period (a maximum of 6 months after the date of the accident or development of the disease after which injury benefit is not payable). Nor do they include incapacity caused by pneumoconiosis and byssinosis, diseases which do not normally cause incapacity for work when first diagnosed, and which do not therefore attract injury benefit.

Discussion

From the records of incapacity for work among insured men it is possible to gain an approximate idea of the varying extent of such incapacity among civilian men at different ages between 15–64 other than those who have never been capable of undertaking any remunerative work; beyond age 65 the picture is blurred by the availability of the retirement pension to those whose health prevents or discourages further work.

Among women, however, only about seven in ten of those in employment and an unknown proportion of the self-employed are insured; the total number represented by analyses of these records amounts to less than one in three of all women of working age, while in some age groups the proportion is very low indeed. The women who are insured are substantially different in their characteristics from those who are not insured, and the sickness records of the two groups are therefore likely to be different, but the extent to which this is true cannot be measured.

TABLE IX

PERSONS EXPERIENCING INDUSTRIAL ACCIDENTS IN GREAT BRITAIN IN THE PERIODS FROM JUNE 7, 1954 TO JUNE 4, 1955, AND FROM JUNE 5, 1955, TO JUNE 2, 1956, ANALYSED BY AGE AND SEX

	Sex	Year	Age at December 31											
			All ages	Up to 19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65 and Over
Average Population at Risk (thousands)	Male	1954–55	13,341	995	1,145	1,496	1,627	1,312	1,504	1,515	1,343	1,021	834	549
		1955–56	13,492	1,015	1,144	1,484	1,569	1,392	1,485	1,537	1,377	1,079	854	556
Claimants experiencing Accidents (thousands)		1954–55	551·7	52·2	52·7	64·6	69·5	56·3	62·3	60·3	54·4	39·1	28·5	11·8
		1955–56	565·44	50·84	54·78	63·66	71·04	59·96	61·36	62·78	56·24	42·36	29·88	12·54
Percentage of Population at Risk experiencing Accidents		1954–55	4·1	5·2	4·6	4·3	4·3	4·3	4·1	4·0	4·0	3·8	3·4	2·2
		1955–56	4·2	5·0	4·8	4·3	4·5	4·3	4·1	4·1	4·1	3·9	3·5	2·2
Average Population at Risk (thousands)	Female	1954–55	7,017	1,180	1,026	712	655	570	719	711	631	472	60 and Over	
		1955–56	7,235	1,182	1,020	705	655	632	753	748	667	507	341	366
Claimants experiencing Accidents (thousands)		1954–55	66·0	12·7	7·4	4·5	3·6	6·5	8·4	7·9	7·2	5·7	2·1	
		1955–56	73·16	14·30	7·86	5·32	5·52	6·30	7·76	8·08	9·04	6·04	2·94	
Percentage of Population at Risk experiencing Accidents		1054–55	0·9	1·1	0·7	0·6	0·6	1·1	1·2	1–1	1·1	1·2	0·6	
		1955–56	1·0	1·2	0·8	0·7	0·8	1·0	1·0	1·1	1·4	1·2	0·8	

Women who are not insured include the great majority of housewives with no gainful occupation (a few who were recently employed retain residual rights); those married women in employment who do not consider it worth their while to pay contributions; and widows entitled to widow's benefits of an equivalent amount. Women insured for sickness benefit are for the most part single, including some women widowed in early life and without children; the insured married women are those who for one reason or another have chosen to pay the national insurance contribution. As this covers unemployment, sickness and maternity benefits, and retirement pensions, the reasons for their choice may be complex, and entitlement to sickness benefit may not enter into the question, though a women in poor health may be influenced to insure for that reason. Of those insured, married women in all age groups show a consistent excess of incapacity for work compared with single women. Only some part of the excess among married women would appear to be due to sickness during pregnancy, as only about 5 per cent. of the incapacity for work recorded (for sickness benefit purposes) among all married women (or 9 per cent. among married women aged 15–44) is due to conditions directly associated with pregnancy and childbirth.

The analyses for women, then, show only the sickness experienced by the five million women contributing under the national insurance scheme. Conversely, it can perhaps be inferred that any analyses relating to all women in the same age groups would not necessarily be applicable to those women who are insured contributors.

Owing to the fact that many insured persons receiving sickness benefit are no longer on the books of their former employers, the amount of incapacity for work recorded among both men and women is greater than is commonly found among employees, and the figures do not provide a standard against which an employer can measure whether his employees have a good or bad record compared with average absence in industry. The heavy weighting of long-term cases shown in Table III is the cause of the striking difference between the average durations (in the period) of "spells current at some time in the period" (which were as high as 33–34 days for men and 38–39 days among the women) and the median durations of spells ending in the period, which were only 12 and 13 days respectively, in both years.

The trend towards increased incapacity with age was to be expected, but the steepness of the rise in later age groups is striking. Differences between men and women in the pattern of claiming as regards both the numbers of claims at different ages and their duration can be attributed at least in part to the proportionate differences in the causes of their incapacity as shown in Table VIII.

Statistics derived from injury benefit records cover broadly all cases of personal injury caused by accident arising out of and in the course of employment, apart from accidents to non-industrial civil servants and some very minor accidents in other fields of employment. They do not include injuries to the self-employed. Statistics of prescribed industrial diseases have the same coverage. Since the injury benefit period is limited to 6 months, there is not the same piling up of long-term cases that prevents sickness benefit records from indicating the average rate of absence from work due to incapacity among employed persons: injury benefit analyses show the extent of incapacity for work due to industrial injuries or diseases among workers in different industries, and so may provide a measuring rod against which individual enterprises can measure their own standard of absence from these causes among men and women respectively.

Summary

Some of the statistics included in the Digest of Statistics Analysing Certificates of Incapacity for 1954–55 and 1955–56, circulated by the Ministry of Pensions and National Insurance, are examined to show:

(1) How far incapacity for work among insured persons indicates the extent of such incapacity among men and women in different age groups in Great Britain;

(2) The amount of incapacity recorded for sickness benefit among insured persons in different age groups in each of two years running from the first Monday in June, the extent of recurrent claims, the weight of long-term sickness, and the commoner causes of incapacity among men and women respectively;

(3) Variations in the extent of incapacity for work among insured men in different parts of the country;

(4) The numbers of persons experiencing industrial accidents at different ages, and the numbers of days of incapacity caused by industrial accidents and diseases in different

INDUSTRIAL ACCIDENTS CAUSING INCAPACITY FOR MORE THAN THREE DAYS AND RESULTING IN THE LOSS OF MORE THAN 1,000 WORK DAYS* LOST TO INDUSTRY BETWEEN JUNE 6, 1955, AND JUNE 3, 1956, INCLUSIVE, SHOWING THE NUMBER OF DAYS LOST PER 1,000 PERSONS EMPLOYED

Sex	Industries	Order No.	Estimated Average Population at Risk (thousands)	No. of Days lost through Accidents Previously Included in Days Lost (thousands)	Motor Vehicles
Male	All Industries		13,492	16,76	
	Agriculture, Forestry, Fishing	I			
	Agriculture, horticulture, and forestry		558	57	
	Fishing		28	3	
	Mining and Quarrying	II			
	Coal mining		759	6,32	
	Other		72	1	
	Treatment of Non-metalliferous Mining Products other than Coal	III	260	3	
	Chemicals and Allied Trades	IV	369	2	
	Metal Manufacture	V	507	7	
	Engineering, shipbuilding and electrical goods	VI	1,609	1,3	
	Vehicles	VII	1,026	5	
	Metal Goods not Classified Elsewhere	VIII	326	2	–
	Precision Instruments, Jewellery, etc.	IX	90		–
	Textiles	X	401	2	
	Leather, Leather Goods, and Fur	XI	41		–
	Clothing	XII	180		–
	Food, Drink and Tobacco	XIII	491	3	
	Manufactures of Wood and Cork	XIV	238	2	
	Paper and Printing	XV	352	2	
	Other Manufacturing Industries	XVI	168	1	–
	Building and Contracting	XVII	1,309	1,5	
	Gas, Electricity, and Water	XVIII			
	Gas		128	1	
	Electricity		176	1	
	Water		33		
	Transport and Communications	XIX			
	Port, river, and canal		108	2	
	Other		1,143	1,1	1
	Distributive Trades	XX	1,158	5	
	Insurance, Banking and Finance	XXI	271		
	Public Administration and Defence	XXII	709	6	1
	Professional Services	XXIII	566	1	
	Miscellaneous Services	XXIV			
	Catering, hotels, etc.		177		–
	Other		239	1	
Female	All Industries		7,235	2,6	

* One week = 6 days

industries showing the main external causes of the relevant accidents;

(5) Whether or not the amount of incapacity due to sickness or injury in the country as a whole can be used as a measuring rod indicating the average absence from work from these causes among employees in different enterprises.

ACCIDENT[illegible]IBED INDUSTRIAL DISEASES
ND JUNE[illegible]IVE, SHOWING CAUSES FOR WHICH INJURY BENEFIT WAS PAID†

Num of Da thro Accide Pres Indu Dis (thou	Days Lost per 100 at Risk										
	Loss Caused by Accidents due to:										Loss Caused by Prescribed Industrial Diseases
	Motor Vehicles	Other Transport	Other Vehicles (*e.g.* conveyor tubs and baggage cars)	Falls	Machinery	Fire, Explosion, Hot or Corrosive Substance, or Radiation	Blow from Falling Object	Cutting or Piercing Instruments	Foreign Body entering Eye or Adnexa	Other	
16	4	3	6	28	11	3	26	6	2	29	7
[illegible]	3	1	4	31	13	1	8	11	2	28	1
[illegible]	1	176	—	26	14	1	9	25	—	18	10
6,[illegible]	1	1	72	141	55	4	269	18	13	198	61
[illegible]	9	—	14	53	17	3	60	7	4	53	3
[illegible]	3	—	6	25	13	4	21	7	1	31	7
[illegible]	3	1	1	19	7	7	10	2	1	18	9
[illegible]	2	—	5	23	16	16	29	8	3	38	7
1,[illegible]	1	3	2	18	12	2	15	4	2	19	5
[illegible]	2	—	2	10	6	1	8	4	2	13	5
[illegible]	—	—	4	11	14	6	17	9	4	21	5
[illegible]	—	—	—	6	3	1	2	2	2	8	4
[illegible]	1	—	1	14	19	4	6	3	—	11	6
[illegible]	—	1	1	9	15	2	3	11	—	14	11
[illegible]	—	—	—	4	5	—	2	4	—	5	2
[illegible]	5	—	2	21	7	4	9	6	—	19	5
[illegible]	6	—	1	17	29	—	13	12	1	19	5
[illegible]	3	—	1	14	13	1	9	3	—	9	3
[illegible]	—	—	3	9	14	2	9	5	—	18	10
1,[illegible]	3	1	2	45	7	3	17	7	2	23	5
[illegible]	2	1	5	36	7	5	12	4	—	39	5
[illegible]	5	—	1	26	4	5	11	5	2	29	4
[illegible]	1	2	—	27	14	2	13	8	2	27	1
[illegible]	4	49	7	30	15	—	50	8	—	36	4
1,[illegible]	12	20	3	25	3	1	11	3	1	22	3
[illegible]	5	1	2	15	3	1	6	5	—	13	1
[illegible]	2	—	—	3	—	—	—	—	—	3	1
[illegible]	10	2	2	28	3	2	8	5	1	21	4
[illegible]	1	—	1	8	1	—	2	1	—	6	3
[illegible]	—	1	—	18	1	2	5	3	—	11	3
[illegible]	2	1	1	23	1	4	2	3	—	15	3
2,[illegible]	1	—	—	12	5	1	3	4	—	6	4

† A few unpaid waiting days are included.

I am most grateful to Mr. D. Newman of the Ministry of Pensions and National Insurance, Newcastle, for much helpful advice, to Mr. R. Woods and Miss D. M. Heal of the Statistics Division, London, for preparing the Tables, to Sir Arthur Massey, Chief Medical Officer, and Dr. W. D. T. Brunyate of the Medical Department, for their interest, and to the Secretary of the Ministry for permission to publish this article.

Brit. J. prev. soc. Med. (1959), **13**, 88–102

SEX PATTERN OF ADMISSIONS TO MENTAL HOSPITALS IN RELATION TO SOCIAL CIRCUMSTANCES

BY

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In England and Wales at the present time very many more women than men are admitted each year to mental hospitals. It has not always been so. Indeed, 50 years ago admission rates were a little higher for males than for females. In 1901, the admission rate per 100,000 over the age of 15 was 93 for males and 89 for females (*i.e.* the male rate was then 4 per cent. higher than the female rate). The corresponding rates for 1951 were 153 and 196 respectively, the female rate now being 28 per cent. higher than the male rate.

The present-day excess of females among admissions is, of course, well recognized, and the reasons for it have been to a limited extent explored. But very little attention has been paid to the remarkable way in which the sex pattern has changed over the past half century. This change is all the more remarkable in that, in magnitude at least, it appears to be peculiar to England and Wales. In the United States and in Canada, for example, age standardized admission rates have always been, and still appear to be, higher for males than for females (Malzberg, 1955; Wanklin, Buck, and Hobbs, 1954).

In this paper we propose first to examine the secular change in the sex pattern of our national statistics and secondly to see what light can be thrown upon this change by an analysis of contemporary data on admissions to Birmingham mental hospitals.

Admission to Mental Hospitals in England and Wales, 1884–1951

The Mental Treatment Act (1930), by establishing out-patient departments for the diagnosis and treatment of mental illness and by introducing a system of voluntary and temporary admission, profoundly altered the pattern of admission to hospital in England. From Fig. 1 (opposite), however, it is clear that, although this act may have led to an accentuation of the difference between male and female admission rates, the difference was there before 1930. The swing from a masculine to a feminine excess has been proceeding gradually and fairly regularly over at least the past 50 years. At the beginning of the 20th century rates were a little higher for males than for females. By 1911 they were equal. Since then the difference between the sexes has been reversed and has become steadily more pronounced. Two phases are discernible, separated by the watershed of the Mental Treatment Act. Between 1901 and 1930 for both sexes admission rates declined, but declined at a much greater rate for males than for females. Since 1930 for both sexes the rates have increased, but have increased less rapidly for males than for females.

The age structure of the population has changed a great deal since 1900, and age has a considerable bearing upon likelihood of admission to hospital. We must consider, therefore, the possibility that the change in the sex pattern of admissions may be no more than the reflection of a change in population age structure.

The basic data relating to all direct admissions to mental hospitals in England and Wales are presented in Table I. They were obtained: for the years 1884, 1891, 1901 and 1911 from the Annual Reports of the Commissioners in Lunacy (1885, 1894, and 1904) and the Board of Control (1915); for the years 1921, 1931, and 1939 from unpublished sources made available by courtesy of the Board of Control; and for the year 1951 from the Registrar General's Supplement on Mental Health (1958). Since data for admissions before 1948 did not include certified patients admitted to workhouses and public assistance institutions, they are somewhat deficient when compared with data for 1951.

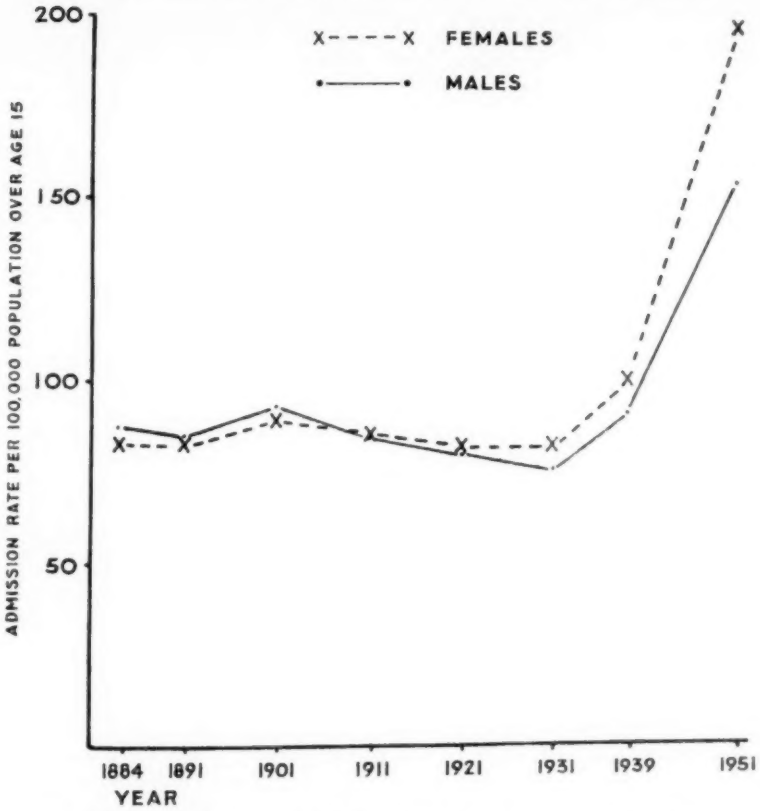

FIG. 1—Secular trend of admission rates to mental hospitals for England and Wales, 1884–1951.

TABLE I

AGE AND SEX-SPECIFIC ADMISSION RATES TO MENTAL HOSPITALS PER 100,000 RELATED POPULATION ENGLAND AND WALES, 1884–1951

Sex		Male							Female						
Age (yrs)		15–	25–	35–	45–	55–	65 and Over	All Ages 15 yrs and Over	15–	25–	35–	45–	55–	65 and Over	All Ages 15 yrs and Over
Year	1884	46	91	115	111	107	105	87	44	88	111	107	98	90	83
	1891	42	83	112	112	111	116	85	42	86	105	114	100	102	82
	1901	45	88	118	122	128	149	93	42	84	111	125	116	130	89
	1911	44	76	98	111	128	135	85	42	78	101	123	117	117	86
	1921	39	70	87	94	111	128	79	41	74	96	115	107	106	82
	1931	38	65	77	87	103	106	76	35	70	89	113	110	93	82
	1939	64	86	90	97	111	115	91	46	85	108	136	137	110	100
	1951	105*	169	133	137	171	230	153†	103*	172	191	214	222	268	196†

* 16–24. † 16 and Over.

During the last part of the 19th century at all ages rates were higher for males than for females (Fig. 2A). By 1911 female rates were already substantially higher than male rates for the age groups 35–44 and 45–54 (Fig. 2B), and 20 years later the female excess was much more pronounced and included the age group 55–64 (Fig. 2C). Today the difference is even greater, and at all ages over 35 female rates are far in excess of the corresponding male rates (Fig. 2D). At the same time male rates have become strikingly bimodal, rising to a peak in young adult life (25–34), falling in middle life and rising rapidly again in the older age groups (55 and over).

The way in which the age pattern has changed since 1844 is shown in Fig. 3 (opposite). For each of the three age groups considered, there is a common pattern of a steady decline of admission rates from 1901 until 1930, which is followed by a rapid increase up to the present time. The relation between male and female rates, however, has been very different in the different age groups. In young adult life there has been no marked difference between the sexes over the whole period (Fig. 3A). In the older age groups male rates have until very recent years been consistently higher than female rates (Fig. 3C). But in middle life (Fig. 3B), we see a very much exaggerated picture of what has happened to the crude admission rate—a rapidly increasing excess of females, which is due to the facts that the decline between 1901 and 1930 was much greater for males than for females and that the rise since 1930 has been much less for males than for females.

Mention should be made here of the cohort method of examining secular trends of the type with which we are concerned (Springett, 1952). This method has proved of particular value in the study of mortality rates from cancer (Case, 1956). It was applied to the data in Table I, but the results did not appear to us to throw any additional light upon the problem and they will not be presented.

To summarize, we may say that with the help of national data we have explored the gradual change from slightly higher admission rates for males at the beginning of the 20th century to substantially higher admission rates for females at the present time. This change is attributable to the fact that between 1901 and 1930, when total admission rates were declining, the rates in middle life (35–64) were falling much more rapidly for males than females, while from 1931 to the present time, when total rates have been rising sharply, the rates in middle life have been increasing much more slowly for males than for females.

Admissions of Birmingham Residents to Mental Hospitals, 1950–1952

Paucity of data makes it impossible to carry much further an analysis of the secular trend of admissions to mental hospitals for the whole country, and we turn therefore to information about all Birmingham residents who were admitted to the city mental hospitals during the years 1950, 1951, and 1952. Data were available both for first admissions and for re-admissions. Admission rates were expressed as the mean annual number of admissions for the 3-year period per 100,000 of the related population at the 1951 Census (Table II, opposite). In the analysis which follows we are concerned for the most part with patients admitted to hospital for the first time. Re-admissions showed similar sex differences and, since they formed a much less homogeneous group and there were comparatively few of them, it was considered justifiable to exclude them.

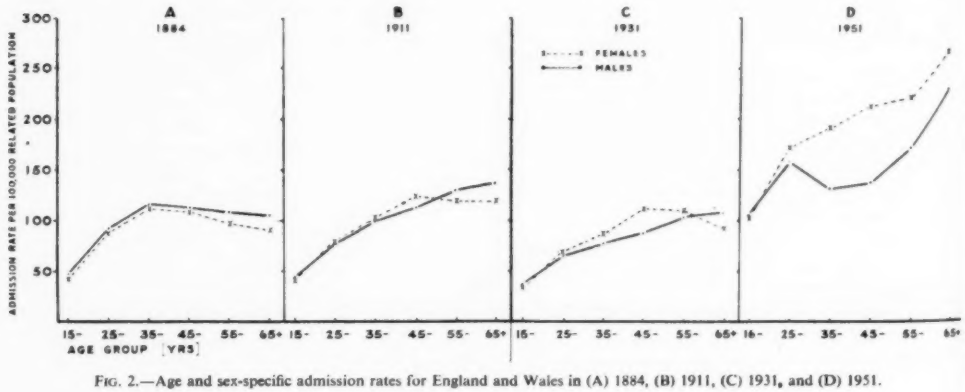

Fig. 2.—Age and sex-specific admission rates for England and Wales in (A) 1884, (B) 1911, (C) 1931, and (D) 1951.

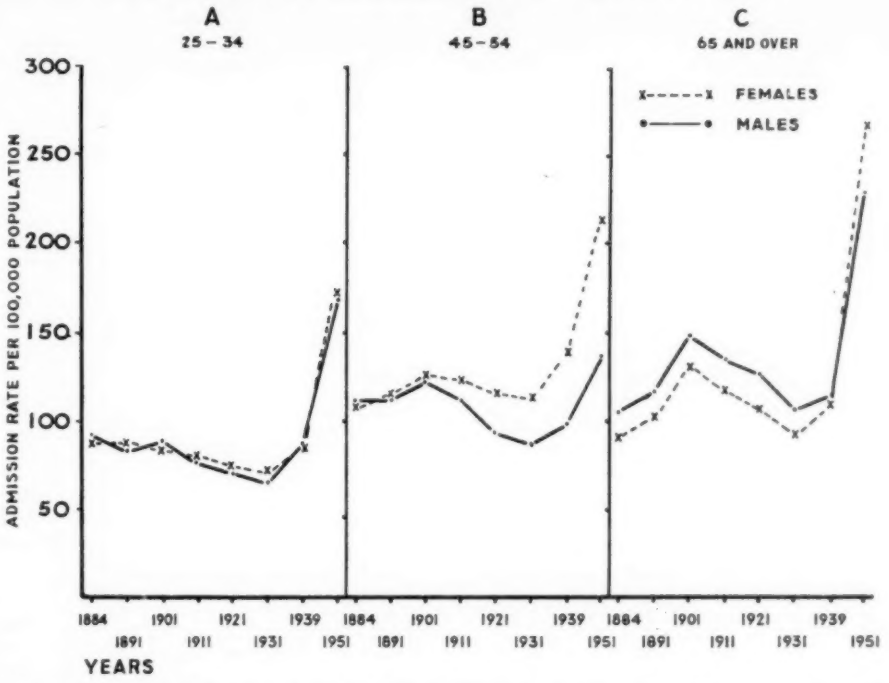

FIG. 3.—Secular trend of admission rates for England and Wales, 1884–1951, for the age groups (A) 25–34 yrs, (B) 45–54 yrs, and (C) 65 yrs and over.

TABLE II

AGE AND SEX-SPECIFIC ADMISSION RATES* TO BIRMINGHAM MENTAL HOSPITALS PER 100,000 RELATED POPULATION FOR 1951

Sex	Male							Female						
Age (yrs)	15–	25–	35–	45–	55–	65 and Over	All Ages 15 yrs and Over	15–	25–	35–	45–	55–	65 and Over	All Ages 15 yrs and Over
First Admissions	46 (91)	75 (198)	66 (175)	61 (130)	102 (142)	204 (250)	82 (986)	47 (107)	83 (220)	86 (222)	90 (205)	110 (194)	229 (431)	103 (1,381)
Re-Admissions	30 (59)	65 (170)	65 (172)	48 (102)	54 (75)	51 (62)	54 (644)	24 (56)	50 (132)	66 (170)	80 (184)	82 (145)	69 (129)	61 (819)
All Direct Admissions	76 (150)	140 (368)	131 (347)	109 (232)	155 (217)	255 (312)	136 (1,630)†	71 (163)	133 (352)	151 (392)	170 (389)	192 (339)	298 (560)	163 (2,200)†

* Admission rates in this and subsequent Tables refer to the mean annual number of admissions for the 3-year period, 1950–1952, per 100,000 population at the 1951 census. Numbers of patients are given in brackets.
† The totals include four males and five females whose ages were not known.

In Fig. 4 (overleaf), age-specific first admission rates for Birmingham are compared with the corresponding rates for England and Wales. Although in general the local rates are a little lower, the difference between male and female admissions for Birmingham is very much the same as that for the country as a whole. This difference will be examined in relation to:

(1) social circumstances,
(2) marital status,
(3) diagnosis.

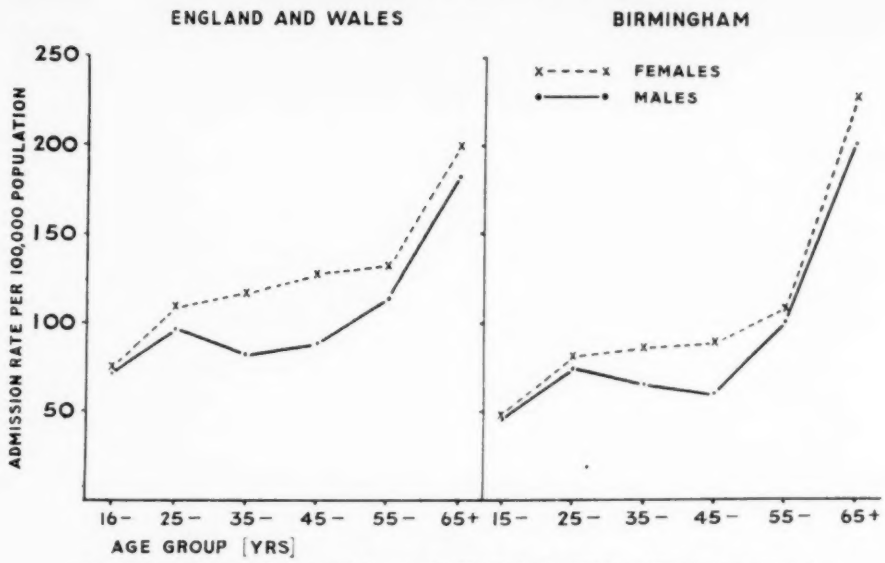

FIG. 4.—Age and sex-specific first admission rates in 1951, England and Wales and Birmingham compared.

(1) SOCIAL CIRCUMSTANCES

There is a great deal of evidence to suggest that admission to hospital for mental illness is to some extent related to social circumstances. It would be surprising if this were not so. Patients in good circumstances are for obvious reasons more likely to be cared for at home and treated as out-patients than patients from poor, overcrowded homes. And at the same time bad living and working conditions might be expected to precipitate break-down in border line cases.

Faris and Dunham (1939) found that first-admission rates to Chicago mental hospitals were directly related to the distance from the city centre of the district from which patients were admitted. The rates were highest for the poorer districts in the middle of the city and lowest for the better class districts around its periphery. This was also true for each major diagnostic sub-group, with the exception of manic-depressive psychosis, for which the admission rates appeared to be distributed at random throughout the city. From a comprehensive study of all patients under psychiatric care (out-patient and in-patient, private and public) in New Haven, Connecticut, during 1950, Hollingshead and Redlich (1953, 1954, 1958) concluded that the prevalence of mental illness is greatest among the population in the lowest social classes. (For the purpose of this study social class was measured on a scale which, in addition to area of residence, took into account occupation and education.) More recently, Malzberg (1956) has demonstrated that in New York State there is a striking relationship between first admissions to mental hospital and educational status. He found that the rates were highest for those who had received no education and lowest for those who had been to High School or College. In England and Wales it is clear that, for males of working age, rates of admission increase sharply from I to V of the Registrar General's Social Classes (Registrar General, 1955). For schizophrenia there is more than a four-fold increase; for manic-depressive psychosis and psychoneurosis the trend, although present, is very much less marked. A pattern similar to that for the whole of the country has been shown also to be present in Bristol (Hare, 1955) and London, (Stein, 1957).

In most of these studies attention was focused mainly upon the social pattern displayed by the different diagnostic categories and the difference between the sexes was not explored. Indeed, when occupation is used as the index of social class (as it has been in the British studies), only the males in the population can be considered, and even for them the method has serious limitations.

The City of Birmingham is divided into 38 municipal wards. Special tabulations of the 1951

Census material were available which gave detailed information about the population, occupations, and housing conditions in each ward (City of Birmingham, 1957). Since the address of each patient at admission was known, it was possible to calculate a first admission rate for each of the wards and to relate it to certain indices of that ward's social and economic status within the city. The four indices available were:

(*a*) *Lack of Amenities.*—Measured by the percentage of households within the ward which did not have the exclusive use of piped water, cooking stove, kitchen sink, water closet, and fixed bath (in the best and worst wards 8 per cent. and 96 per cent. of households respectively lacked all these amenities).

(*b*) *Overcrowding.*—The percentage of households containing one or more persons per room (range 19–55 per cent.).

(*c*) *Occupational Status.*—The percentage of gainfully occupied males in Social Classes IV and V combined (range 13–48 per cent.).

(*d*) *Proportion of Single Person Households.*—The percentage of households consisting of one person only, *i.e.* of persons living alone (range 3–18 per cent.).

Our aim was to divide the 38 city wards into three approximately equal groups according to their social status and to compare the male with the female pattern of admission in those groups. There was a positive correlation between the ward admission rates (all ages 15 and over) and each of the four indices of ward status (Table III). The closest association was between the male admission rate and the lack of amenities ($r = +0{\cdot}63$). The male rate and the proportion of single person households were also highly correlated ($r = +0{\cdot}56$). In both these cases the corresponding correlation coefficient was very much lower for females. If a single index was to be used to effect our purpose of grouping the wards according to the standard of living enjoyed by the people domiciled in them, the choice appeared to be between lack of amenities and proportion of single person households. These two variables were themselves highly correlated ($r = +0{\cdot}77$). But when the proportion of single person households was held constant, the correlation between admission rate and lack of amenities was $+0{\cdot}38$ for males and $+0{\cdot}26$ for females, whereas when lack of amenities was held constant, the corresponding correlations between admission rate and proportion of single person households were $+0{\cdot}15$ and $-0{\cdot}01$. This suggests, at least so far as Birmingham is concerned, that bad housing conditions may have more bearing upon the chances of admission to a mental hospital than social isolation, the importance of which may perhaps have been over-emphasized by Faris and Dunham (1939), Clark (1949), and Hare (1956).

TABLE III

FIRST ADMISSION RATES FOR EACH MUNICIPAL WARD IN BIRMINGHAM CORRELATED WITH INDICES OF THAT WARD'S SOCIAL AND ECONOMIC STATUS, BY SEX

First Admission Rate Correlated with:	Correlation Coefficients	
	Males	Females
Percentage of Households without Exclusive Use of All Amenities ..	+0·63	+0·38
Percentage Overcrowding	+0·36	+0·39
Percentage of Occupied Males in Social Classes IV and V	+0·52	+0·47
Percentage of Single Person Households	+0·56	+0·29

The wards were therefore arranged in rank order according to the percentage of households in them lacking all the amenities. The fourteen wards with the worst housing conditions formed a natural group around the centre of the city. The remaining 24 wards were divided into a peripheral and an intermediate group, thus giving three ward groups with roughly comparable populations (Table IV and Fig. 5, overleaf).

Admission rates the three ward groups are shown in Table V (overleaf). For both first admissions and re-admissions the rates were highest in the wards at the centre of the city with the worst housing conditions and lowest in the wards around its periphery with best housing conditions. In each ward group the rates were higher for females than for males but the range from centre to periphery was greater for males and the difference between the sexes was most marked in the peripheral wards (Fig. 6, overleaf).

The pattern of admission in relation to ward group was not the same at all ages. Under the age of 35 admission appeared to be very little and over 65 not at all affected by social circumstances (Table VI, overleaf). It was among middle-aged patients (35–64) that admission to hospital was most clearly related to unsatisfactory living conditions. And it was in this age group that the sex difference was at its greatest. This point is clearly shown in Fig 7 (overleaf). In the central wards there was little difference between the sexes in the age pattern of first admissions. In the peripheral wards throughout middle life, rates were very much higher for females than for males. Indeed, in the age group 35–44, women were admitted to hospital at nearly twice the rate for men.

TABLE IV

BIRMINGHAM MUNICIPAL WARDS CLASSIFIED IN RELATION TO AN INDEX OF HOUSEHOLD AMENITIES, SHOWING FIRST ADMISSION RATES, BY SEX

Central Wards				Intermediate Wards				Peripheral Wards			
Rank Order	Index of Household Amenities*	First Admission Rate		Rank Order	Index of Household Amenities*	First Admission Rate		Rank Order	Index of Household Amenities*	First Admission Rate	
		Males	Females			Males	Females			Males	Females
1	96	110	107	15	66	87	87	26	24	50	113
2	94	93	120	16	59	113	130	27	24	47	87
3	94	77	57	17	58	90	120	28	23	97	110
4	92	83	100	18	46	60	90	29	22	80	113
5	92	117	120	19	43	93	87	30	17	60	83
6	91	73	140	20	41	80	100	31	14	50	70
7	89	70	113	21	39	43	107	32	14	57	93
8	85	107	100	22	39	60	83	33	14	43	80
9	84	110	107	23	37	87	107	34	13	80	120
10	83	83	103	24	37	80	80	35	13	53	97
11	78	100	110	25	29	83	117	36	10	63	63
12	68	73	100					37	9	63	77
13	68	110	107					38	8	60	83
14	66	77	107								

* Percentage of households without exclusive use of all the following amenities: piped water, cooking stove, kitchen sink, water closet, and fixed bath.

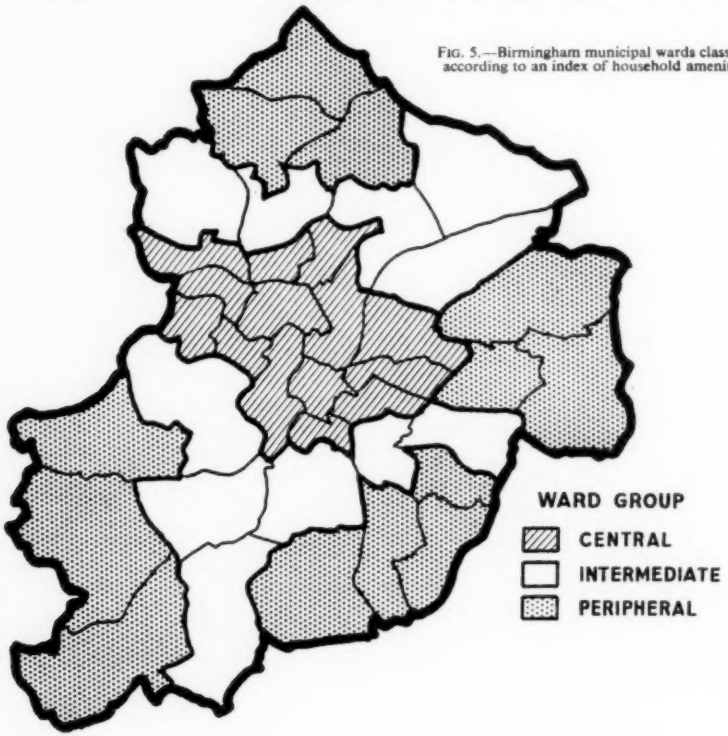

FIG. 5.—Birmingham municipal wards classified according to an index of household amenities.

TABLE V

ADMISSION RATES (ALL AGES OVER 15) BY SEX AND WARD GROUP, BIRMINGHAM, 1951

Sex		Male			Female		
		First Admissions	Re-Admissions	All Direct Admissions	First Admissions	Re-Admissions	All Direct Admissions
Ward Group	Central	91 (379)	58 (239)	149 (618)	105 (482)	67 (307)	173 (789)
	Intermediate	81 (274)	46 (156)	127 (430)	101 (403)	55 (220)	156 (623)
	Peripheral	62 (276)	41 (184)	103 (460)	92 (451)	49 (242)	141 (693)

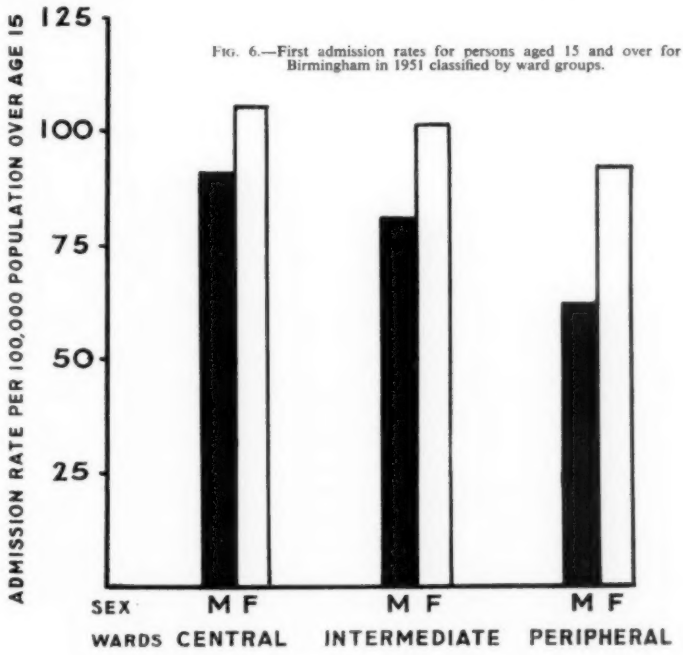

FIG. 6.—First admission rates for persons aged 15 and over for Birmingham in 1951 classified by ward groups.

TABLE VI

AGE AND SEX-SPECIFIC FIRST ADMISSION RATES, BY WARD GROUP

Sex		Male			Female		
Age (yrs)		15–34	35–64	65 and Over	15–34	35–64	65 and Over
Ward Group	Central	67 (112)	91 (184)	177 (83)	66 (116)	99 (208)	220 (157)
	Intermediate	57 (70)	64 (113)	222 (91)	60 (81)	89 (177)	222 (144)
	Peripheral	54 (92)	51 (123)	176 (61)	61 (113)	87 (224)	221 (114)

To summarize, when the present-day age-pattern of first admissions to hospital from the central wards of Birmingham was compared with that of admissions from the peripheral wards, it was found that the difference between the sexes was not unlike that disclosed when national admission rates at the end of the 19th century were compared with those of to-day. For the central wards of Birmingham in 1951 and for England and Wales in 1901 there was very little difference at any age between the sexes. To-day, for the peripheral wards of Birmingham as for the country as a whole, the rates in middle life are much higher for females than for males.

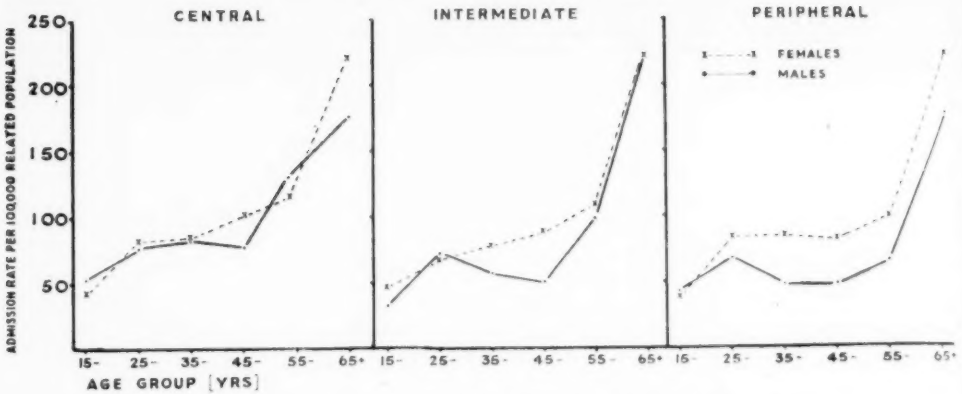

FIG. 7.—Age and sex-specific first admission rates for Birmingham in 1951, classified by ward groups.

(2) MARITAL STATUS

It is known that admission rates are in general much higher for single than for married persons (Registrar General, 1953, 1955; Norris, 1956). The interpretation of this observation is not easy. One would expect a psychotic personality to militate against marriage, while single persons, lacking the protection and support of a husband or wife, are perhaps more likely to be admitted to hospital. Whatever the explanation, it is clearly necessary to inquire whether marriage has any bearing upon the difference between the male and female admission rates which we are exploring.

In Birmingham, first admissions conformed to the general pattern and, for both males and females at all ages over 25, the rates were considerably higher for single than for married persons (Table VII). When age-specific rates for the two sexes were compared in relation to marital status, the excess of female admissions in middle life on which we have been focusing attention was found to be confined to married patients (Fig. 8, opposite). Indeed, for the age groups 25–34, 35–44, and 45–54, in each of which there was a striking feminine preponderance among married patients, admission rates for single persons were higher for males than for females.

It was noted earlier (Table V and Fig. 6) that crude first admission rates were higher in the city wards with the worst housing than in those with the best housing, and that the gradient from worst to best was much steeper for males than for females. The next step, therefore, is to inquire what effect housing conditions had upon the admission of married and single persons. In the age group 25–54 (for which the sex difference was at its greatest) the rate of admission to hospital was lower in the peripheral wards than in the central wards for both married and single men (Table VIII and Fig. 9, overleaf). But for women the pattern was quite different. Ward housing conditions appeared to have little bearing upon the admission of married women, while for single women the peripheral ward group had the highest

TABLE VII

AGE AND SEX-SPECIFIC RATES (BIRMINGHAM) FOR SINGLE AND MARRIED PERSONS

Age (yrs)			15–	25–	35–	45–	55–	65 and Over	All Ages 15 yrs and Over
Sex	Male	Single	47 (79)	162 (112)	168 (51)	130 (23)	167 (15)	282 (23)	101 (303)
		Married	38 (11)	42 (81)	53 (121)	54 (102)	90 (109)	177 (147)	68 (571)
	Female	Single	46 (77)	136 (66)	159 (54)	121 (39)	182 (43)	345 (83)	110 (362)
		Married	46 (29)	69 (147)	72 (154)	78 (136)	97 (107)	173 (112)	82 (685)

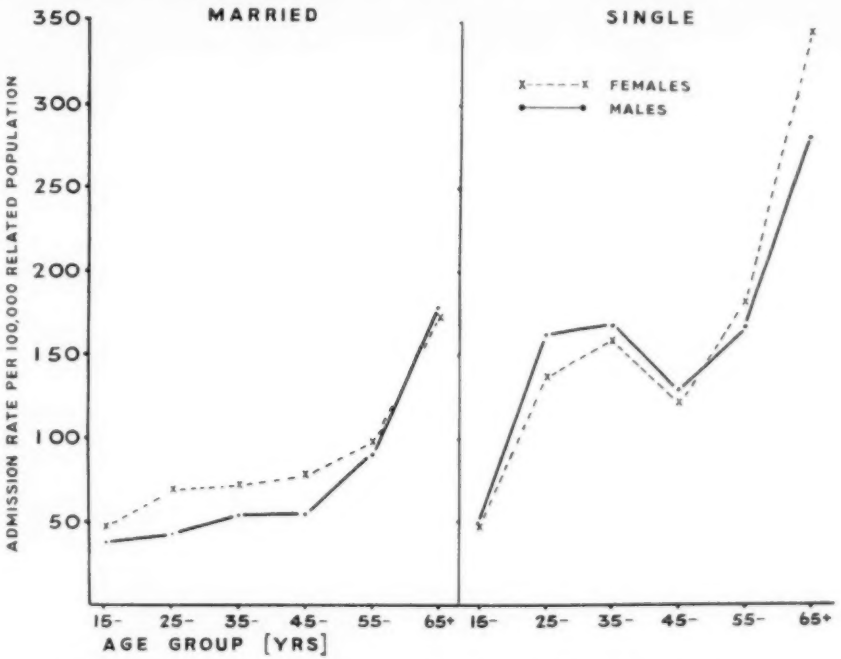

FIG. 8.—Age and sex-specific first admission rates for Birmingham in 1951, classified by marital status.

admission rate. The effect of these trends upon the sex ratio of admissions was striking (Table VIII). For married persons the female admission rate was 80 per cent. higher than the male rate in the peripheral wards, and it was only 23 per cent. higher in the central wards. For single persons the female rate was 5 per cent. higher in the peripheral wards, but was 19 per cent. lower than the male rate in the central wards.

To summarize, it was shown in the preceding section that for the poorer districts of Birmingham there was no great difference between men and women in respect of the rate at which they were admitted for the first time in middle life. But for the better districts the rate was much higher for females than for males. This striking difference is due to the fact that, in the age group 25–54 for both married and single men, the admission rates were directly related to poor housing conditions, being lowest in the best and highest in the worst districts, whereas for married women the rates were high in all districts, and for single women they were actually highest in the best districts.

(3) DIAGNOSIS

The diagnostic classification of psychiatric illness is generally admitted to be a difficult and uncertain matter. There is sometimes considerable variation from hospital to hospital in the same area, and diagnostic criteria can vary from psychiatrist to psychiatrist even in the same hospital. The name given to a patient's illness at the time of his first admission to a mental hospital is particularly subject to terminological vagary. The results of our examination of pooled diagnostic data on first admissions from four large hospitals must therefore be interpreted with caution.

Data are presented only for the age group 25–54, for which, as shown above, the sex, social class, and marital status differences were greatest. Our purpose is to see what further light analysis by diagnosis can throw upon the reason why admission rates were very much higher for females than for males in this age group and why the excess of female over male rates was greatest in the peripheral wards.

TABLE VIII

FIRST ADMISSION RATES FOR PERSONS AGED 25–54 YRS, BY MARITAL STATUS, WARD GROUP, AND SEX

Marital Status		Married			Single		
Ward Group		Central	Intermediate	Peripheral	Central	Intermediate	Peripheral
Sex	Males	61 (126)	44 (72)	41 (97)	151 (73)	135 (47)	135 (46)
	Female	75 (148)	65 (108)	74 (178)	123 (49)	123 (50)	141 (48)
$\frac{F}{M} \times 100$		123	148	180	81	91	105

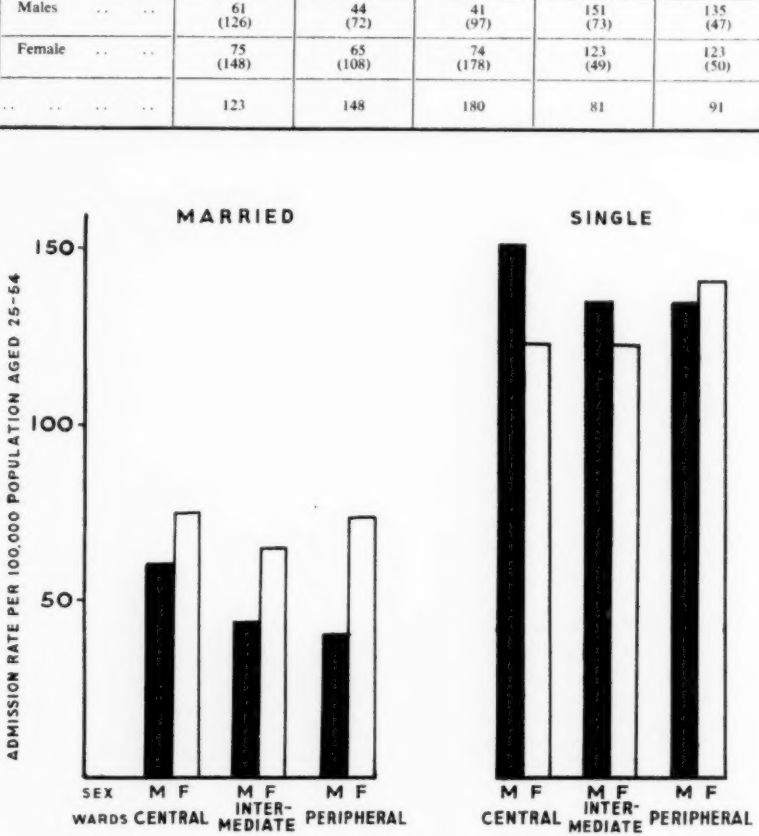

FIG. 9.—First admission rates for persons aged 25 to 54 for Birmingham in 1951, classified by marital status and ward groups.

The data were grouped into four diagnostic categories based on the International Statistical Classification of Diseases, Injuries and Causes of Death (World Health Organization, 1949):

(*i*) Affective Psychoses (Code 301 and 302), which included only manic depressive reaction and involutional melancholia.

(*ii*) All Other Psychoses (Code 300, and 303–309), the most important of which in this age group were schizophrenia, paranoia, and psychoses resulting from organic conditions.

(*iii*) Psychoneuroses (Code 310–318).

(*iv*) All Other Diagnoses (pathological and immature personalities, alcoholism and drug addiction, epilepsy, general paralysis, etc.).

The great excess of females among married persons in this age group was attributable to the fact that married women had much higher admission rates than married men for affective psychoses and psychoneuroses (Table IX). For these two categories there was also a considerable feminine preponderance among single persons. (The excess of males in the other two categories was sufficient, however, to over-ride this difference and to produce for all single persons a rate slightly higher for males than for females.)

In view of this it was considered justifiable to group single and married persons together for the purpose of examining the relation between the diagnosis and the ward group from which the patients had been admitted. When this was done (Table X) it was evident that three distinct trends were contributing to the excess of female admissions from the peripheral wards (Fig. 10, overleaf).

The first and most striking trend was in respect of Diagnostic Categories *ii* (all psychoses other than the affective psychoses) and *iv* (all other diagnoses). Patients who fell into these categories were admitted to hospital at a lower rate from the peripheral than from the central wards. The gradient from the centre to periphery was present for both sexes but was very much steeper for males, with the result that, when all these conditions were grouped together, admission rates in the central wards were considerably higher for males than for females, while in the peripheral wards the reverse was true and rates were considerably higher for females than for males (Fig. 10C).

The second trend was in relation to the psychoneuroses (Diagnostic Category *iii*). For these conditions the admission rates were very much higher for females than for males in each of the ward groups, and for both sexes they were rather lower in the peripheral wards (Fig. 10B). However, the sexes did not differ very greatly in respect of the social gradient so that the psychoneuroses, although making a considerable contribution to the feminine preponderance among admissions from the city as a whole, played little part in determining the change in the sex-ratio from the centre to the periphery of the city.

The third trend was perhaps the most interesting; it was certainly the least expected. This was the sex

TABLE IX

FIRST ADMISSION RATES (BIRMINGHAM) FOR PERSONS AGED 25–54, BY SEX, MARITAL STATUS, AND DIAGNOSIS

Sex		Male			Female		
Marital Status		Single	Married	All Persons*	Single	Married	All Persons*
Diagnosis	(i) Affective Psychoses	14 (16)	11 (65)	11 (84)	27 (31)	20 (119)	22 (166)
	(ii) All Other Psychoses	70 (82)	16 (96)	24 (181)	60 (69)	19 (115)	26 (199)
	(iii) Psycho-neuroses	26 (30)	15 (90)	17 (127)	30 (34)	26 (156)	27 (204)
	(iv) All Other Diagnoses	32 (38)	7 (44)	11 (82)	11 (13)	7 (44)	8 (61)
Total		142 (166)	48 (295)	64 (474)	128 (147)	72 (434)	84 (630)

* Including widowed and divorced (13 males and 49 females).

TABLE X

FIRST ADMISSION RATES (BIRMINGHAM) FOR PERSONS AGED 25–54, BY DIAGNOSIS AND WARD GROUP

Sex		Male			Female		
Ward Group		Central	Intermediate	Peripheral	Central	Intermediate	Peripheral
Diagnosis	(i) Affective Psychoses	8 (22)	14 (28)	12 (34)	18 (46)	22 (47)	25 (73)
	(ii) All Other Psychoses	33 (85)	24 (49)	17 (47)	29 (72)	24 (52)	26 (75)
	(iii) Psycho-neuroses	20 (52)	15 (30)	16 (45)	32 (79)	24 (51)	26 (74)
	(iv) All Other Diagnoses	17 (45)	8 (16)	8 (21)	10 (25)	8 (17)	7 (19)
Total		78 (204)	60 (123)	53 (147)	89 (222)	77 (167)	84 (241)

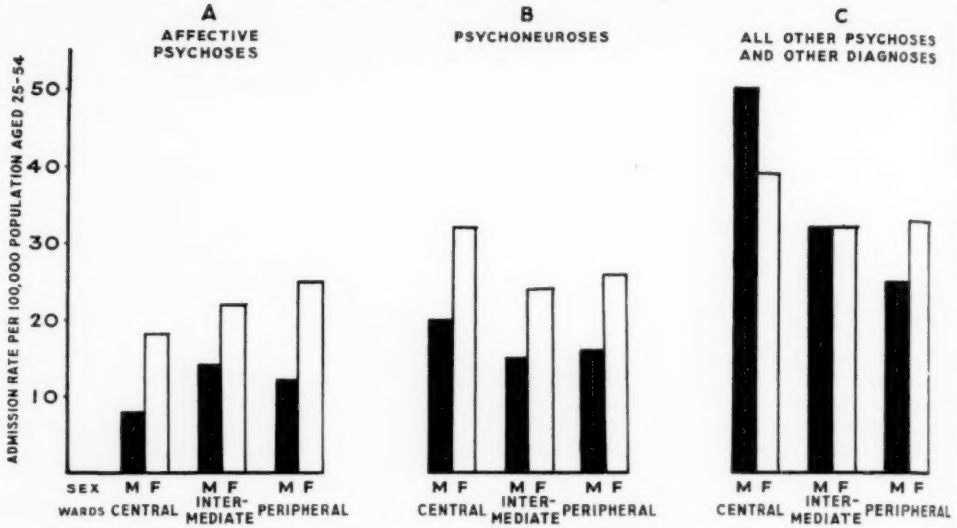

FIG. 10.—First admission rates for persons aged 25 to 54 for Birmingham in 1951, by diagnosis and ward groups.

and ward group pattern of admission for the affective psychoses (Fig. 10A). As for the psychoneuroses, admission rates for the affective psychoses were very much higher for females than for males in each of the ward groups (the female rate was, in fact, twice the male rate). But in contradistinction to the psychoneuroses and to other psychoses and all other conditions, the rates for the affective psychoses were, if anything, a little higher in the peripheral than the central wards.

To summarize, it appears that from the diagnostic point of view there are two main reasons why there was a marked excess of females among patients admitted at ages 25–54 from the peripheral wards of the city and no great difference between the sexes among those admitted from the central wards. In the first place, for all psychoses other than the affective psychoses and for the group of miscellaneous conditions which included pathological personality and general paralysis, the admission rates were considerably lower in the peripheral than the central wards, and the difference was much greater for males than for females. Secondly, for the affective psychoses and the psychoneuroses, the admission rates were much higher for females than for males, and since they did not differ greatly from ward to ward in the city their proportionate contribution to the total admission rate was greatest at the periphery.

DISCUSSION

In the older parts of most large industrial towns in England and Wales it is still possible to find people living in 19th-century housing conditions and subject to something approaching 19th-century mortality and morbidity. Birmingham is no exception. With an extensive redevelopment plan in progress the pattern of housing is changing rapidly. But at the time of the 1951 Census the worst living conditions were still to be found in the centre of the city and the best at its periphery. In most of the central wards less than one in five of the households had exclusive use of a piped water supply, a cooking stove, a kitchen sink, a water closet, and a fixed bath; in most of the peripheral wards less than one in five were without these amenities. The present-day difference between the morbidity and mortality experience of families living in the poorer central wards and that of families living in the more well-to-do peripheral wards might be expected, therefore, to reflect to some extent the secular change that has occurred over the past half century for the country as a whole. The annual reports of successive medical officers of health for Birmingham make it quite clear that this is true for infant mortality and for morbidity from tuberculosis and the infectious diseases of childhood. Our data suggest that it may also be true for admissions to mental hospital.

At the beginning of the 20th century, the national admission rates were a little higher for males than for females. To-day they are very much higher for females than for males. We have found that this reversal of the sex-ratio is traceable to a change which occurred in the pattern of admissions in middle life: male rates declined substantially while female rates remained relatively stable. For example, for the age group 45–54, the male admission rates fell from 122 to 1901 to 87 in 1931 (a decline of 29 per cent.) while the female rates fell from 125 to 113 (a decline of only 10 per cent.). (Since 1930 the admission rates for both sexes have, of course, risen steeply but the same underlying pattern is discernible in that male rates have risen less steeply than female rates.) We have demonstrated that a resemblance to this secular change can be traced in the pattern of present-day admissions from the central, intermediate, and peripheral wards of Birmingham. For the age group 35–64, the male admission rates fell from 91 in the central to 51 in the peripheral wards (a decline of 44 per cent.), while female rates fell from 99 to 87 (a decline of only 12 per cent.).

This suggests that the secular change from a slight masculine to a considerable feminine preponderance observed at the national level has been brought about by the tendency for male admissions to be much more influenced by adverse living conditions than female admissions, with the result that as the standard of living has risen male rates have fallen but female rates have remained relatively unaffected. The Birmingham data indicate that the male rates most sensitive to social circumstances are those attributed to all psychoses other than the affective psychoses and to a group of miscellaneous conditions which includes pathological personality and cerebral syphilis. If once again we argue by analogy from the contemporary social pattern to the secular trend, it seems possible that between 1900 and 1930 admissions for these two diagnostic groups may have declined, and declined more for males than for females, while admissions for the affective psychoses and the psychoneuroses, both of which are highly feminine and are relatively unaffected by social circumstances, have remained stationary and have so been thrown into greater prominence. Since 1930 this pattern has been obscured by the rapid increase in admission rates brought about by the change in public attitude towards hospital care which was encouraged first by the legal provisions of the Mental Treatment Act and more recently by therapeutic advances. But the essential features of the difference between male and female admission rates in relation to social circumstances have probably remained the same.

Early records are so inadequate and diagnostic criteria have changed so much that it is impossible to substantiate this suggestion from national data. Two points may be mentioned, however. First, for the period 1908–12, acquired syphilis accounted for 19·4 per cent. of male and 3·1 per cent. of female admissions (Commissioners in Lunacy, 1914); for 1950–52, the corresponding proportions were 2·4 and 0·7 per cent. (Registrar General, 1955, 1958). Secondly, Shepherd (1957), in his study of the major psychoses in an English county, concluded that between the two triennia 1931–33 and 1945–47 the first admission rate for schizophrenia had declined and that for affective illness had increased.

In conclusion, it must be admitted that inquiries of this nature tend to pose more questions than they answer. They serve a useful purpose, however, in that the problems they reveal are usually more specific than those they solve. It seems to us that our investigation has uncovered two problems worthy of closer scrutiny: why are admissions for the affective psychoses unrelated, or possibly inversely related, to adverse living conditions and twice as common for females as for males? and why are males with other psychotic disorders, in so far as admission to hospital is concerned, much more sensitive than females to adverse living conditions?

Both these questions relate to hospital admission rates which are as much a measure of the adequacy of out-patient facilities, the number of beds available, and the attitude of patients and their relatives to hospital care as of the prevalence of mental illness in the community. Nevertheless, if they can be answered, light may be thrown upon the part played by the social environment in the aetiology of the psychoses. Admission to hospital is inevitably related to social circumstances because domiciliary care is easier in a well-to-do than in a poor home. But this applies as much to the affective psychoses as to other psychotic disorders, and admission rates for these two groups of diseases behaved very differently in relation to housing conditions in the city wards. It may not be justifiable to assume that mental illness is precipitated by bad living conditions on the grounds that for most mental disorders admission to hospital was much commoner from the poorer parts of the city. But it seems to us reasonable to conclude that the incidence of the affective psychoses increases as standard of living rises from the evidence that admission for these conditions was slightly commoner from the better parts of the city.

SUMMARY

The first part of this paper is concerned with the secular change in the sex pattern of admissions to mental hospitals in England and Wales.

At the end of the 19th century admission rates were a little higher for males than for females, whereas to-day they are much higher for females than for males. This is due to a change in the pattern of admissions in middle life (35–64): between 1901 and 1930 male rates declined substantially while female rates remained relatively stable; since the Mental Treatment Act (1930) rates for both sexes have risen steeply, but much less for males than for females.

The second part presents data on first admissions of Birmingham residents to mental hospitals for the triennium 1950–52 in relation to census information about the 38 municipal wards from which they were admitted. Admission rates were found to be highly correlated with adverse housing conditions. The wards were divided into a central group with the worst housing, a peripheral group with the best housing, and an intermediate group.

Admission rates were highest for the central wards and lowest for the peripheral wards. The gradient from centre to periphery was most marked for middle-aged patients and was much greater for males than for females, with the result that, for the better wards at the city's periphery, the rates were very much higher for females than for males.

For both married and single men, admission rates in middle age were found to be highest for the central and lowest for the peripheral wards. In contrast, the rates for married women were high for all ward groups and for single women were actually highest for the peripheral wards.

For all psychoses other than the affective psychoses, and for a group of miscellaneous conditions which included pathological personality and cerebral syphilis, the rates were very much higher for the central than for the peripheral wards, and this difference was much more marked for males.

For the psychoneuroses, the rates were very much higher for females than for males and for both sexes they were only a little higher for the central wards.

For the affective psychoses, the rates were also very much higher for females than for males but they were, if anything, a little higher for the peripheral than for the central wards.

It is suggested that the difference between the admission rates for the poorer central wards and those for the better-to-do peripheral wards in Birmingham at the present time reflects to some extent the secular change which has occurred for the country as a whole over the past half century. The implications of this suggestion are discussed.

It is with pleasure that we acknowledge the assistance given to us by Dr. W. S. Maclay of the Board of Control and Mr. A. B. Neale of the Central Statistical Office, Birmingham. We are also indebted to the Birmingham Regional Hospital Board and to the Medical Superintendents of the four Birmingham mental hospitals for allowing us access to records.

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